THEMIS

User Manual

XV2

Intel® Quad-Core Xeon® CPU / 1.73 GHz / 6RU VME64 Platform

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XV2 Hardware Manual

Version 1.0—August 2011

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CE

This product complies with the European EMC Directive (2004/108/EC) and the European Low Voltage Safety Directive (2006/95/EC)/.

Safety Precautions

Instructions regarding safety precautions during installation, operation, or maintenance of the equipment are given in the section entitled “Safety Instructions” on page iv.

WARNINGS and CAUTIONS

The definitions of WARNINGS and CAUTIONS as used in this document are given in the Preface in the section entitled “Notes, Cautions, Warnings, and Sidebars” on page xviii.

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Safety Instructions

To maximize user safety and ensure correct device operation, all instructions contained in this section should be read carefully.

Caution: It is important that the user observe all warnings and instructions that are on the device and contained in this manual.

- The device must be used in accordance with the instructions for use.
- Electrical installations in the room must correspond to the requirements of respective regulations.
- Take care that there are no cables, particularly mains cables, in areas where persons can trip over them.
- Do not use a mains connection in sockets shared by a number of other power consumers. Do not use an extension cable.
- Do not set up the device in the proximity of heat sources or in a damp location. Make sure the device has adequate ventilation.
- All connection cables must be screwed or locked to the chassis housing.
- The device is no longer safe to operate when
  - — the device has visible damage or
  - — the device no longer functions.
- In these cases, the device must be shut down and secured against unintentional operation.
- Repairs may only be carried out by a person authorized by Themis Computer.
- If extensions are made to the device, the legal stipulations and the device specifications must be observed.

Electrostatic Discharge (ESD)

A sudden discharge of electrostatic electricity can destroy static-sensitive devices or micro-circuitry. Proper packaging and grounding techniques are necessary precautions to prevent damage. Always take the following precautions:

1. Transport boards in static-safe containers such as boxes or bags.
2. Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
3. Always be properly grounded when touching a sensitive board, component, or assembly.
4. Store electrostatic-sensitive boards in protective packaging or on conductive foam.

Grounding Methods

Guard against electrostatic damage at workstations by following these steps:

1. Cover workstations with approved anti-static material. Provide a wrist strap connected to a work surface and properly grounded tools and equipment.
2. Use anti-static mats, heel straps, or air ionizers to give added protection.
3. Handle electrostatic-sensitive components, boards, and assemblies by the case or the PCB edge.
4. Avoid contact with pins, leads, or circuitry.
5. Turn off power and input signals before inserting and removing connectors or test equipment.
6. Keep the work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.
7. Use field service tools, such as cutters and screwdrivers, that are conductive.
8. Always place drives and boards PCB-assembly-side down on the foam.

Instructions for the Lithium Battery

Motherboards are installed with a lithium battery. To replace this battery, please observe the instructions that are described in this manual.

Warning: There is a danger of explosion when the wrong type of battery is used as a replacement.

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Preface Section

How to Use This Manual

The Themis XV2 single-board computer (see *Figure 1*) is a high-performance 6RU VME-bus computer with an Intel® quad-core Xeon™ processor that operates at 1.73 GHz clock speed. It supports a variety of I/O from the Front Panel—including BMC, gigabit Ethernet, USB 2.0, SATA, SAS, serial, audio, and VGA graphics—as well as from the VME P2 backplane connector—including KB/mouse, USB 2.0, SATA, SAS, gigabit Ethernet, and VGA graphics. Connection to signals on the VME P2 backplane is made through two Themis Paddle Cards. Up to 24 GB of DDR3 SDRAM memory—with ECC Error Detection/Correction—can be installed and operated over three independent DDR3 channels (see *Figure 2-1*, page 2-3, in Chapter 2). Operating systems include Linux and Microsoft Windows.

This *XV2 Hardware Manual* [P/N 118156-022] describes how to install the XV2 and gives a hardware overview, including a list of XV2 features and specifications.

Figure 1. XV2 Single-Board Computer

XV2 users may obtain greater graphics capability than the onboard XV2 graphics by installing a T2GPX XMC Graphics Card in a XV2 XMC/PMC module slot.

Themis Computer values its customer comments and opinions; therefore, a “Reader Comment Card” is located at the end of this manual for your use. Please take the time to fill out this card with any comments concerning Themis products and services, and return it to Themis Computer. Your comments may also be forwarded to Themis by sending email to docfeedback@themis.com.

Before you begin, carefully read each of the procedures in this manual. Serious damage can be caused by improper handling of the equipment.

Intended Audience

This manual is written for system integrators and programmers. It contains all necessary information for installation and configuration of the XV2 and assumes the UEFI program code is installed in the system Flash memory. If you intend to operate the XV2 with an operating system other than Linux or Windows, please consult the appropriate documentation supplements accompanying your OS or kernel software.

Programmers wishing to write code for the XV2 without the benefit of an operating system or real-time kernel will require additional data sheets. The reader should have a working knowledge of VMEbus and PCI local bus standards, as well as Ethernet and SATA specifications.

Unpacking

Caution: The XV2 contains statically sensitive components. Industry-standard antistatic measures must be observed when removing the XV2 from its shipping container and during any subsequent handling. A wrist strap provides grounding for static electricity between your body and the chassis of the system unit.

Remove the XV2 and accessories from the shipping container and check the contents against the packing list. Be certain to observe industry-standard ESD protection procedures when handling static-sensitive components. The package should include all elements of your order.

Please report any shipping discrepancies to the Themis Computer Customer Support group immediately: support@themis.com or 1-510-252-0870.

When sending the XV2 back to Themis for any reason, the customer must use the original shipping container, packed exactly as described in Appendix F, “Re-Packing Instructions”, of this manual. To ship the XV2 without following the procedures outlined in Appendix F **may invalidate the warrantee**.

Chapter Overview

The chapters and appendices of this manual are briefly outlined as follows:

- Chapter 1, "XV2 Installation", provides instructions on the installation and configuration of the XV2 for your particular environment and application.

Note: The information contained in Chapter 1 is **mandatory** to understand and configure the correct operation of the XV2. This chapter should be read in its entirety.

- Chapter 2, "XV2 Features and Specifications", provides a brief overview of the XV2, along with its System, Environmental, and Power specifications.
- Chapter 3, "Hardware Overview", describes the major components installed on the XV2.
- Appendix A, “Connector Pinouts and Signal Descriptions”, provides part numbers, pinouts, and signal descriptions for the I/O connectors on the XV2 Baseboard and Paddle Card.
- Appendix B, "Jumper Pins and Solder Beads", provides a detailed description and default configuration of each of the jumper pins and solder beads on the XV2, as well as diagrams illustrating their location on the PCB.

Note: Appendix B should be consulted to verify that the jumper pins and solder beads on your system are set to meet your application requirements.

- Appendix C, “Front-Panel I/O Connections and LEDs”, illustrates the Front Panels for all model configurations of the XV2.
- Appendix D, “Board Component and Connector Diagrams”, provides descriptions of the major components and connectors of the XV2 Baseboard and Paddle Card.
- Appendix E, “VME Slot Configurations”, illustrates the various model config-

urations used by the XV2.

- Appendix F, “Re-Packing Instructions”, outlines the proper procedures to follow to re-pack the XV2 for shipping.

Notes, Cautions, Warnings, and Sidebars

The following icons and formatted text are included in this document for the reasons described:

Note: A note provides additional information concerning the procedure or action being described.

Caution: A caution describes a procedure or action that may result in damage to the equipment. This may involve—but is not restricted to—heavy equipment or sharp objects. To reduce the risk, follow the instructions accompanying this symbol.

Warning: A warning describes a procedure or action that may cause injury or death to the operator. To reduce the risk, follow the instructions accompanying this symbol.

Sidebar: A “sidebar” adds detail to the section within which it is placed, but is not absolutely vital to the description or procedure of the section.

Website Information

Themis Computer corporate and product information may be accessed on the World Wide Web by browsing the website http://www.themis.com.

The Sales & Marketing Department may be reached at info@themis.com.

Product Warranty and Registration

Please review the Themis Computer warranty and complete the product registration card delivered with your XV2 board(s). Return of the registration card is not required to activate your product warranty but, by registering your XV2, Themis Computer will be better able to provide you with timely information updates and product-enhancement notifications.

Our Customer Support department is committed to providing the best product support in the computer industry. Customer support is available 8am—5pm (PST), Monday through Friday, via telephone, fax, e-mail, and our website.

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Website: http://www.themis.com

In Case Of Difficulties

If the XV2 does not behave as described or if you encounter difficulties installing or configuring the board, please call Themis Computer technical support at +1 (510) 252-0870, fax your questions to +1 (510) 490-5529, or e-mail to *support@themis.com*. You can also contact us via our web site: http://www.themis.com.

Your Comments are Welcome

We are interested in improving our documentation and welcome your comments and suggestions. You can email your comments to us at **docfeedback@themis.com**. Please include the document part number (118156-022) in the subject line of your email.

Installation Section

Chapter 1

XV2 Installation

1.1 Determine Board Type

The Themis XV2 single-board computer is available in a single model configuration, which occupies two VME slots.

To determine your Baseboard configuration, check the white sticker located near your Baseboard's VME P2 connector. It contains information on board type and revision, memory allocation, CPU speed, serial number, and Ethernet addresses (up to 4). Note that the following example illustrates three Ethernet addresses only:

Themis [XV2-12GB-1730-CC A1] [P13007860]

ETHERNET [00 80 B6 04 70 F6] [00 80 B6 04 70 F7] [00 80 B6 04 70 F8]

which is interpreted as follows:

- *Board Type (Model):* **XV2**
- *SDRAM:* **12 GBytes**
- *CPU Frequency:* **1.730 GHz**
- *Production Information:* **CC (Conformal Coating)**
- *Revision:* **A1**

- *Serial Number:* **P13007860**
- *Ethernet Address(es):* **00 80 B6 04 70 F6**, **00 80 B6 04 70 F7,** and **00 80 B6 04 70 F8**

To install the XV2, a standard VME64 chassis with J1/J2 backplane (3-row or 5-row connector) is required.

1.2 Check Configurations

When you first receive the XV2, confirm that the jumper-pin and solder-bead configurations on both the CPU Board and the I/O Board are appropriate for your application. Appendix B, ”Jumper Pins and Solder Beads” gives detailed information regarding the locations of jumper pins and solder beads, and also their default settings.

Note that jumper pins are located on both sides of the CPU Board, but do not exist on the I/O Board. Also note that solder beads are located on the bottom side only of the CPU Board, and on the top side only of the I/O Board.

Solder-bead settings are set by Themis at the factory before shipping and should only be changed by Themis at the factory.

Warning: Attempting to alter a solder-bead configuration could seriously damage the XV2. DO NOT ATTEMPT TO ALTER SOLDER-BEAD CONFIGURATIONS. Instead, contact Themis to change any settings.

1.3 Install the Paddle Cards

Two Paddle Cards have been designed to provide access to the P2 connector signals of the XV2 VME backplane, one attaches to the rear of the P2 slot occupied by the CPU Board (see *Figure 1-1* on page 1-5), the other attaches to the rear of the P2 slot occupied by the I/O Board (see *Figure 1-2* on page 1-6).

Note: In the older **XV1**, some pins on the P2 connector are used to provide a mandatory input supply voltage (either +12V or +5V) that is required to operate the XV1. Therefore, the XV1 Paddle Card must be installed for operation of the XV1 unless some other means of delivering power to these pins is devised.

In the **XV2**, supplementary input voltage is not required for the **CPU Board**, hence it is not necessary to install the CPU Board Paddle Card to provide this voltage source. However, supplementary input voltage may be required for the **I/O Board** through the I/O Board Paddle Card if an installed XMC Module requires it.

1.3.1 CPU Board Paddle Card (*Optional*)

The I/O connections provided by the XV2 CPU Board Paddle Card are described in *Table 1-1* (note that only a 3-row P2 connector is supported). A pinout and signal description of each I/O connector of the Paddle Card is given in Appendix A, “Connector Pinouts and Signal Descriptions”.

Table 1-1. XV2 CPU Board P2 Paddle Card I/O Connections

I/O Connections	Definition	3-Row P2
4 USB ports	USB3 / USB4 and USB6 / USB7	Yes
1 PS/2 keyboard/mouse port	Mini-DIN8 connector (split-cable 110104-002 is required to attached a keyboard and a mouse)	Yes
3 SATA Ports	SATA3, SATA4, and SATA5	Yes
+12V and +5V power	*Not required*	Yes

Warning: Plug the XV2 Paddle Card into the **P2 connector backplane only**. If inserted into the P1 connector, it will cause damage to the Paddle Card and the XV2.

If you have installed a CPU Board Paddle Card, go to Section 1.5, "Attach Paddle-Card Cables" to attach the appropriate cables to the connectors. Themis provides most of these cables in the Integration Kit shipped with the XV2 (see *Table 1-3*).

1.3.2 I/O Board Paddle Card (*Optional* if No XMC Module)

Note: Install to provide supplementary input voltage for XMC Module.

The I/O connections provided by the XV2 I/O Board Paddle Card are described in *Table 1-2* (note that only a 3-row P2 connector is supported). A pinout and signal description of each I/O connector of the Paddle Card is given in Appendix A, "Connector Pinouts and Signal Descriptions".

Table 1-2. XV2 I/O Board P2 Paddle Card I/O Connections

I/O Connections	Definition	3-Row P2
2 LAN ports (RJ45)	Dual Gigabit Ethernet C and Gigabit Ethernet D	Yes
1 VGA monitor port	Super VGA video support	Yes
1 SAS/SATA Port	SAS and SATA support	Yes
+12V and +5V power	*Not required for PMC Modules; used to support XMC Module(s) only* Through one 6-pin Molex connector (use power cable P/N 111230-001 to connect)	Yes

Warning: Plug the XV2 Paddle Card into the **P2 connector backplane only**. If inserted into the P1 connector, it will cause damage to the Paddle Card and the XV2.

If you have installed an I/O Board Paddle Card, go to Section 1.5, "Attach Paddle-Card Cables" to attach the appropriate cables to the connectors you will be using. Themis provides most of these cables in the Integration Kit shipped with the XV2 (see *Table 1-3*).

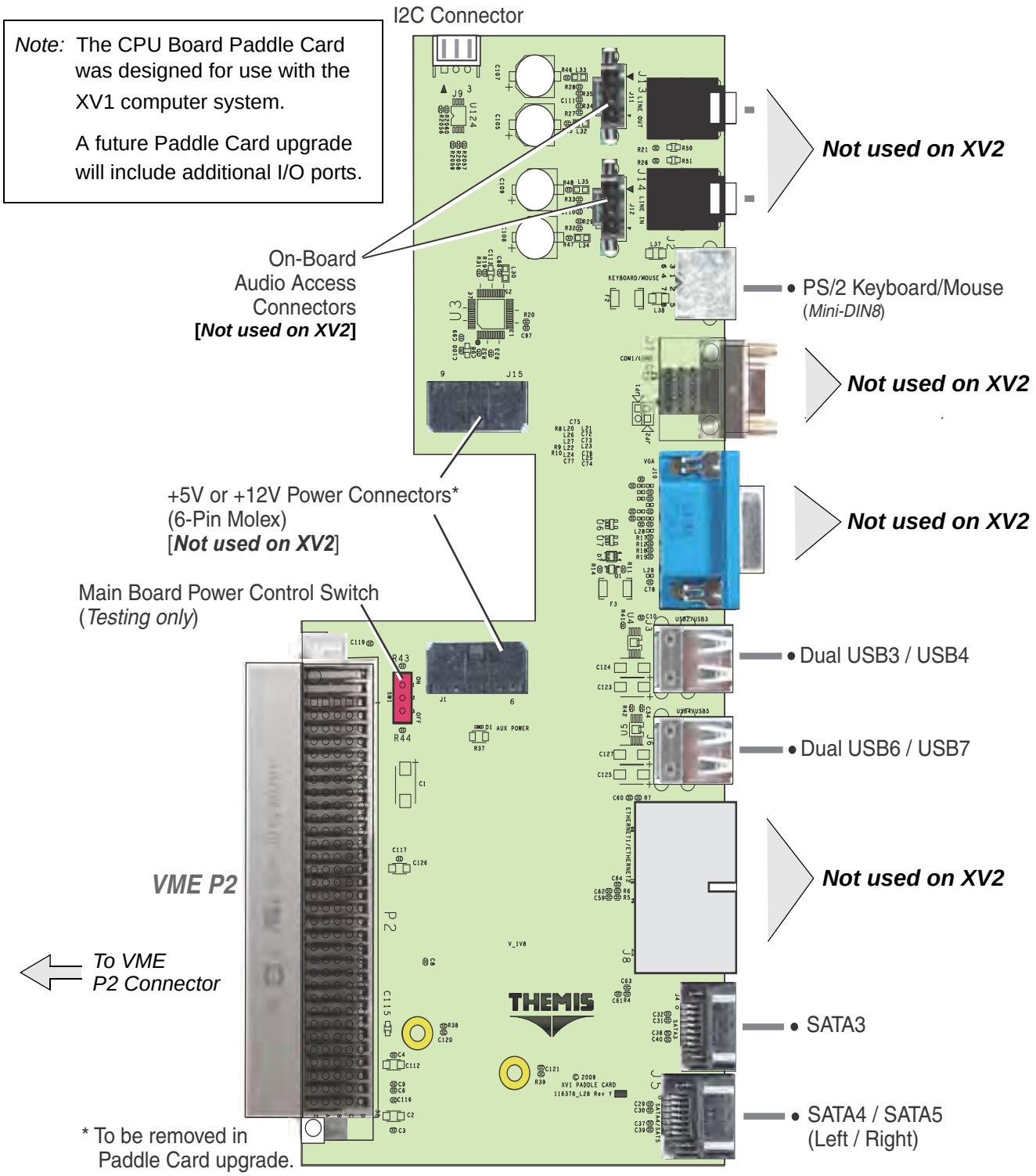


Figure 1-1. CPU Board Paddle Card Connector Diagram (Top Side)

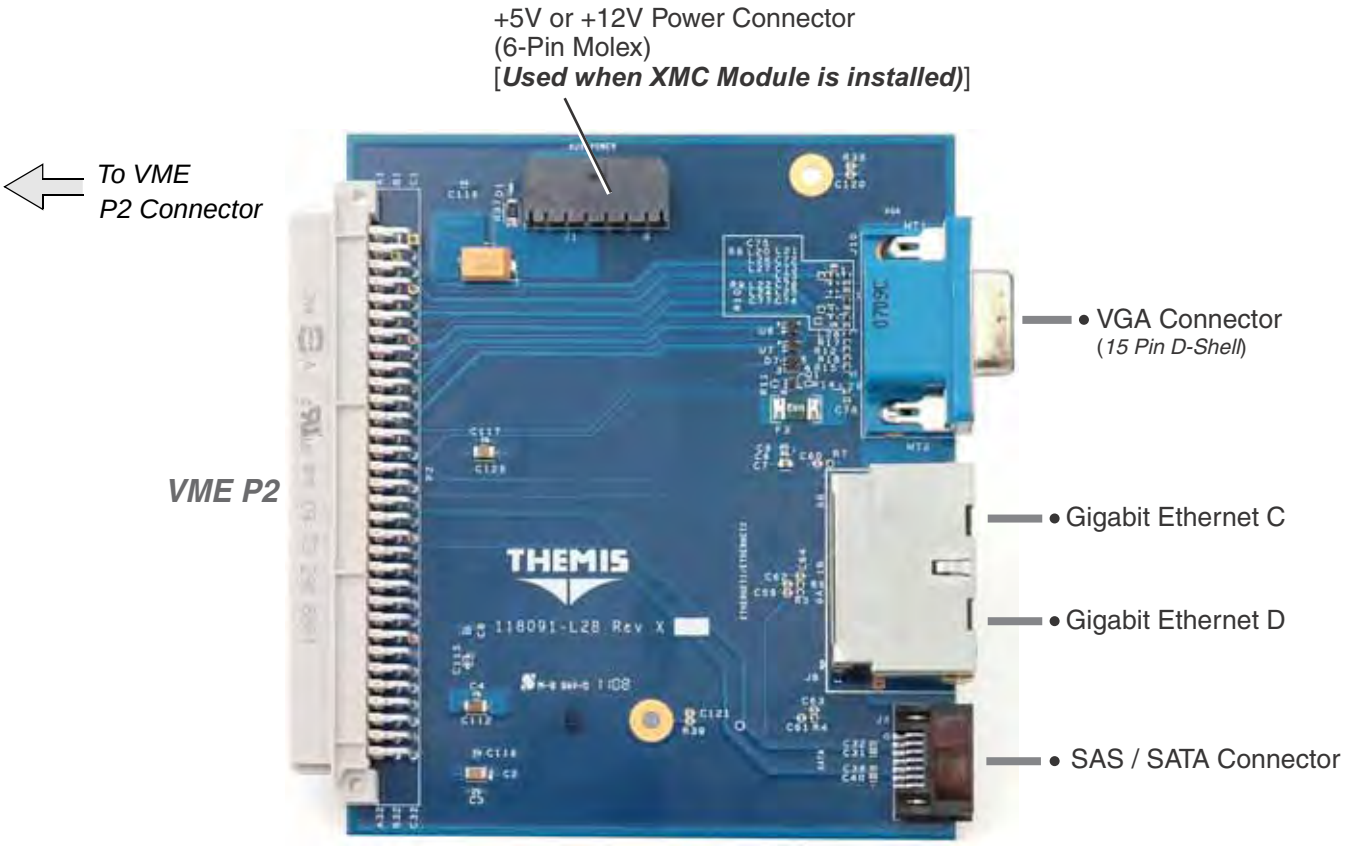


Figure 1-2. I/O Board Paddle Card Connector Diagram (Top Side)

Table 1-3. XV2 Integration Kit (Order-Dependent)

Quantity	Description	Part Number	Kit	Where Used
1	XV2 CPU Board Paddle Card, 3-Row	116378-L02	002	P2 Connector
1	XV2 I/O Board Paddle Card, 3-Row	118091-L01	002	P2 Connector
1	*Special Split Pigtail Cable*—8-pin mini-DIN to 6-pin Keyboard DIN and 6-pin Mouse DIN	110104-002	All	Paddle Card
1	Cable, Serial, RS232 (Mini-DB9-M to DB25-M)	108113-06	Only one cable required	Paddle Card (Non-Null Modem Cable)
1	Cable, Serial, RS232 (Mini-DB9-M to DB9-F)	113057-001		Paddle Card (Null Modem Cable)
2	Cable, Power	111230-001	All	CPU or I/O Board Paddle Card

1.4 Attach Front-Panel I/O Cables

To connect the XV2 to peripheral devices and networks, you must attach the proper I/O cables to the appropriate Front Panel and VME P2 Paddle Card connectors. Refer to Appendix A, “Connector Pinouts and Signal Descriptions” for connector pinouts and signal descriptions, as well as Appendix C, “Front-Panel I/O Connections and LEDs”. *Table 1-4* lists the I/O connections that can be attached to the XV2 Front Panel.

Table 1-4. XV2 Front-Panel I/O Connections

	Connections	Definition
CPU Board	2 LAN ports (RJ45)	Dual Gigabit Ethernet A and Gigabit Ethernet B
	1 BMC port	Micro-DB9 connector
	4 USB ports	USB A, USB B, USB C, and USB D, all with Keyboard/Mouse support
	1 Serial port (RJ45)	COM1 (Modem Support)
	2 SATA ports	Dual SATA Port A and Port B
	1 HD Audio line in	High-definition audio (Intel) input and output ports
	1 HD Audio line out	
I/O Board	1 SAS/SATA port	4-channel SAS or SATA port
	1 VGA graphics port	Super VGA port
	2 XMC/PMC Modules	I/O cabling dependent on the XMC‘/PMC card installed

1.4.1 CPU Board

1.4.1.1 Gigabit Ethernet Ports A and B

The XV2 features two RJ45 LAN connectors (each with two status LEDs and an embedded transformer) on the Front Panel (Gigabit Ethernet Ports A and B) for 10/100/1000Base-T Ethernet interface connections.

Use a standard RJ45 cable to connect to an external network. After attaching the XV2 to a network through one of the Ethernet Ports, you can verify if a proper physical connection has been made by executing the proper network command.

1.4.1.2 BMC Connector

The BMC (baseboard management controller) connector is used to control the power-on sequence whenever two or more XV2 systems are installed in the same VME chassis. This avoids the surge current associated with multiple concurrent startups, which can overwhelm the power supply.

To connect to the internal BMC microcontroller, attach the BMC cable to the micro-DB9 connector on the XV2 Front Panel.

1.4.1.3 USB Ports A, B, C, and D

Any one of the USB ports can support keyboard/mouse protocols as well as standard USB devices.

1.4.1.4 Serial Port COM1

The RJ45 serial port COM1 supports standard signals as defined in *Table A-8*, page A-12, of Appendix A, “Connector Pinouts and Signal Descriptions”.

1.4.1.5 SATA Ports A and B

The dual SATA ports A and B support signals as defined in *Table A-9*, page A-13, of Appendix A, “Connector Pinouts and Signal Descriptions”.

1.4.1.6 High-Definition (HD) Audio Ports

Use the stereo Audio In (Line In) port and Audio Out (Line Out) port to connect to the high-definition audio ports. Signals are defined in *Table A-10*, page A-14, of Appendix A, “Connector Pinouts and Signal Descriptions”.

1.4.2 I/O Board

1.4.2.1 4-Channel SAS/SATA Port

The 4-channel SAS/SATA port supports positive and negative transmit/receive signals as described in *Table A-11*, page A-15, of Appendix A, “Connector Pinouts and Signal Descriptions”.

Make sure to connect to the SAS/SATA port using the proper cable.

1.4.2.2 VGA Graphics Port

The VGA graphics port supports standard graphics signals as defined in *Table A-12*, page A-16, of Appendix A, “Connector Pinouts and Signal Descriptions”

1.4.2.3 XMC/PMC Module Ports

The I/O Board of the XV2 supports the installation of one or two XMC/PMC Modules, each of which may require cables that must be connected to support Module activities.

Note: If an installed XMC Module requires auxiliary power from the host XV2, an I/O Board Paddle Card is required (see “Auxiliary +12V/+5V Power Connectors”, page 1-11).

1.5 Attach Paddle-Card Cables

The XV2 supports two Paddle Cards, one designed to attach to the P2 VME connector behind the CPU board, the second to attach to the P2 VME connector behind the I/O board.

Although most Paddle-Card cables are associated with I/O connectors, it is important that the auxiliary +12V/+5V power cable(s) also be connected to chassis (rack) power to provide the appropriate voltage to support higher power levels required by certain XMC Modules installed onto the XV2 I/O Board.

[Go to Section 1.5.3, “Auxiliary +12V/+5V Power Connectors,” on page 1-11 for more information.]

1.5.1 CPU Board Paddle Card

1.5.1.1 SATA Ports 2, 3, and 4

Attach a standard SATA connector cable to any of the three SATA ports on the CPU Paddle Card. Attach the other end to the desired device.

1.5.1.2 High-Definition (HD) Audio Ports

To establish a stereo audio I/O connection, attach a standard mini-audio plug (3.5

mm) to the line-in and line-out audio jacks of the Paddle Card.

1.5.1.3 PS/2 Keyboard & Mouse

Connect the special Split Pigtail Cable (8-pin mini-DIN to 6-pin Keyboard DIN and 6-pin Mouse DIN; P/N 110104-002) to the PS/2 Keyboard/Mouse port on the Paddle Card. Connect each of the split ends to a keyboard and a mouse.

[A pinout of the PS/2 Keyboard/Mouse is given in *Figure A-14* on page A-28 of Appendix A, with signal descriptions described in *Table A-21*, page A-28.]

1.5.1.4 USB Ports 3, 4, 6, and 7

Connect a standard USB 2.0 cable to any of the four USB ports on the Paddle Card.

[A pinout of USB Ports 2, 3, 4, and 5 is given in *Figure A-15* on page A-29 of Appendix A, with signal descriptions described in *Table A-22*, page A-29.]

1.5.1.5 Serial Ports COM1 and COM2

Each DB9 serial port COM1 and COM 2 supports standard signals as defined in *Table A-8*, page A-12, of Appendix A, "Connector Pinouts and Signal Descriptions"

1.5.2 I/O Board Paddle Card

1.5.2.1 SAS/SATA Port

After connecting a cable to this port, the system will negotiate the proper SAS or SATA protocol.

1.5.2.2 VGA Graphics Port

Connect one end of a VGA DE-15 connector to the VGA graphics port and the other end—if not already attached—to a display monitor.

1.5.2.3 Gigabit Ethernet Ports A and B (LANA, LANB)

Use a standard RJ45 cable to connect to an external network. After attaching the XV2 to a network through one of the Ethernet Ports, you can verify if a proper physical connection has been made by executing the proper network command.

1.5.3 Auxiliary +12V/+5V Power Connectors

Caution: Under normal operating conditions, your XV2 receives sufficient power from the VME backplane to sustain operation. The addition of certain XMC Modules to the system might require the installation of auxiliary power cable(s) to the I/O Board Paddle Card from a +12V or +5V source on the chassis (rack). Not installing this power cable could result in system malfunction.

To find out whether your system requires additional power from the VME backplane, look up the requirements listed in the manufacturer product specifications issued with the installed Module.

The user has the option of providing either +12 volts or +5 volts to the XV2 to supplement the voltage supply provided through the VME backplane. Either voltage option is sufficient to operate the XMC Module(s). For typical power requirements, see *Table 2-7*, page 2-9, in Chapter 2, "XV2 Features and Specifications".

[A pinout of the power connector is given in *Figure A-20* on page A-34 of Appendix A, with signal descriptions described in *Table A-27*, page A-34.]

+12V Power Connector

Connect **only one** power cable (P/N 111230-001) to either one of the 6-pin power connectors (J1 or J15) on the Paddle Card. Connect the other end of the power cable to the appropriate +12-volt voltage source of the 19” rack power supply.

+5V Power Connectors

Connect **both** power cables (P/N 111230-001) to each of the 6-pin power connectors (J1 and J15) on the Paddle Card. Connect the other end of each power cable to the appropriate +5-volt voltage source of the 19” rack power supply.

1.6 Daisy-Chain Jumper Settings

In compliance with the VME Specification, any VME-based XMC/PMC Carrier Board assures the backplane continuity between bus grants BG[0..3]IN to BG[0..3]OUT, and the interrupt acknowledge daisy-chain IACKIN to IACKOUT.

1.7 TOD/NVRAM Battery

The XV2 has its own lithium battery (3V) to operate the TOD clock and maintain the contents of the NVRAM during a power shutdown. Located directly on the top surface of the CPU Board, the battery provides power backup for approximately three (3) years.

To access the battery for replacement, it is not necessary to disconnect any boards or remove the front faceplate. DO NOT REMOVE the I/O Board or CPU heatsink.

1. Remove the SDRAM 1 Memory Module (see *Figure 1-3*). This is done by gently pressing down and outward on the latches at both ends of the slot, then pulling the Module directly up from the slot until it is free of the connector.

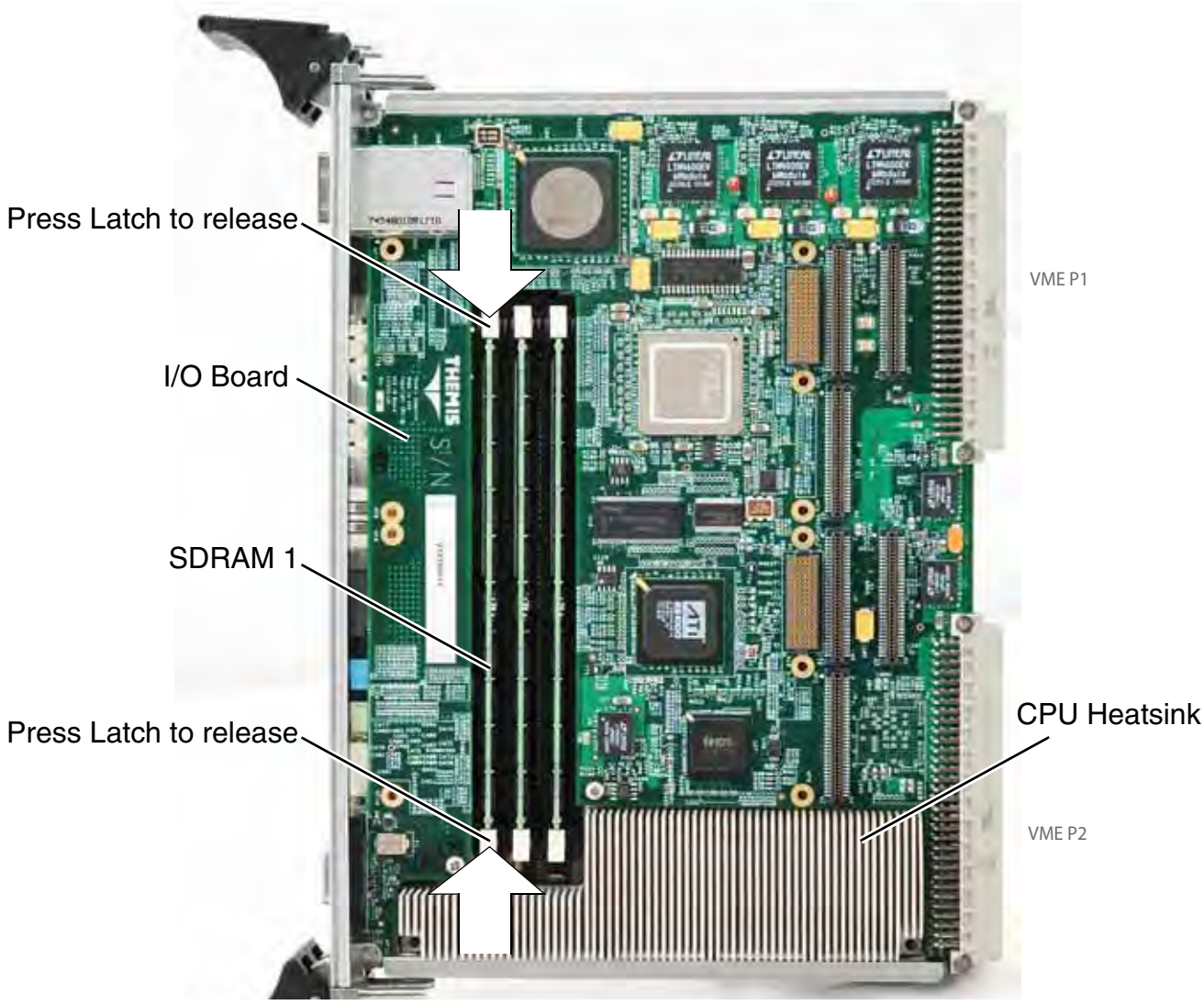


Figure 1-3. Remove SDRAM 1 from its Slot

2. Insert the “Orange” stick (shipped with your system) into the vacant SDRAM 1 slot at an angle approximate to that shown in *Figure 1-4*. Make contact with the top edge of the battery as shown in **A** of *Figure 1-4* and carefully push the battery toward the bottom edge of the system until the battery is ejected from its holder. Locating the proper spot on the battery from which to push will be easier by peering through the space between the CPU and I/O Boards either from the bottom edge of the system or through the open SDRAM slot.

3. When replacing the battery, make sure the plus (+) side is facing away from the surface of the CPU Board.

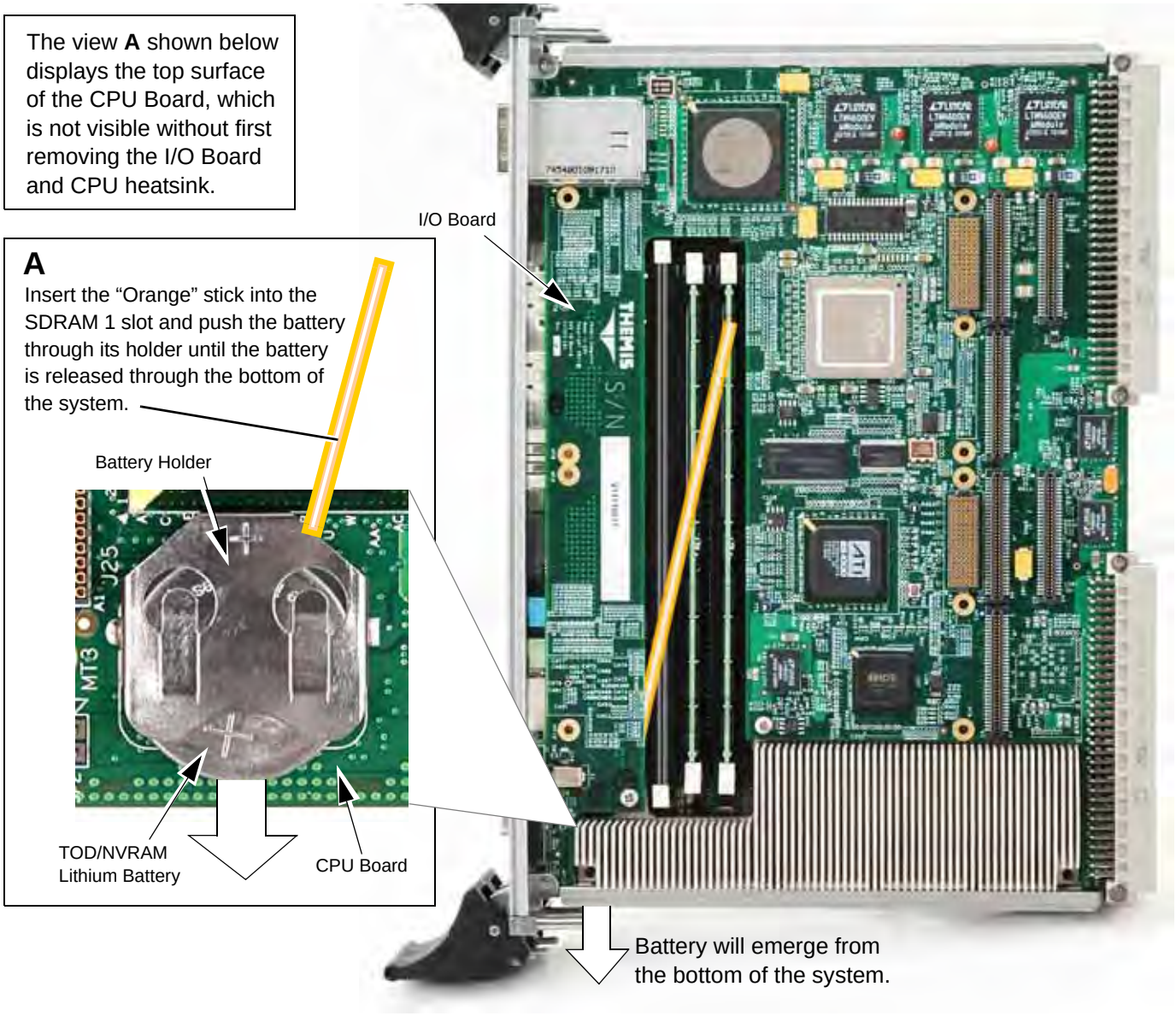


Figure 1-4. Insert the Orange Stick and Push the Battery through its Holder

1.8 Program the XV2 Power-Up Delay Using the BMC Serial Port

Connect the serial cable between the client PC and the XV2.

Cable connections:

- Mini-DB9 connector to the XV2 front-panel BMC port
- Standard DB9 connector to the PC serial port

Start HyperLink (or equivalent) on the client PC with the following serial-port parameters: 115200 baud, 8 bits, 1 stop, no parity, no handshake.

Note: The client PC can be replaced by other terminal devices that support the RS232 serial port protocol.

Power up the XV2. You should see the following (the actual delay value depends on the DIP switch or the last programmed value):

```
Themis Computer, XV2 V0.5

SET Delay = 3500 ms

#
```

Type "`help`". You should see the following:

```
# help

XV2 V:0.5
help:
i2c  [dump|index]
ibw  <addr> <d0>..<d7> : i2c block write
ibr  <addr> <size> : i2c block read
in   display P0.0-3 and P2.0-7 inputs
out  [val]: set the put to P1.0-7, or read back
set  [val]: set delay to overwrite the dip switch
or   help [command] for detail
#
```

For detailed help on the "`set`" command, type "`help set`". You should see the following:

```
# help set

XV2 V:0.5
set [val]
set the delay value [0-7], this will overwrite the dip switch
ex.# set 1 <-- set the delay to 500ms
ex.# set <---- display the delay time
ex.# set ff <- use dip switch to set delay time
#
```

Experiment with the `set` command to vary the XV2 power-up delay.

Type "`set 0`" at the command prompt. Cycle XV2 power while observing the XV2 front-panel LEDs. With the start-up delay set to 0, the LEDs should turn on immediately after chassis power is applied.

From the BMC serial port, the power-up splash screen should show the delay = 0.

Repeat the set test with `set = 7`. It should take about 3.5 seconds from the application of chassis power until the XV2 front-panel LEDs turn on. The power-up splash screen should show `delay = 3500 ms`.

Specification Section

Chapter 2

XV2 Features and Specifications

2.1 Basic Features

The XV2 was designed to provide a low-power Intel quad-core Xeon CPU platform in a dual-slot, 6RU high, VME64 form factor. The XV2 is implemented as a VME-bus board based on Intel LC5518 CPU support (Jasper Forest) and the Intel 3420 PCH (Platform Controller Hub)—formerly Ibex Peak—3420 chipset, supporting PCI and PCI-Express expansion capabilities (see *Figure 2-1*, page 2-3).

On-board XMC/PMC sites allow I/O expansion for graphics and general I/O.

Basic features of the XV2 include:

- One Intel 1.73-GHz LC5518 quad-core Xeon processor
- Up to 24 GB of DDR3 SDRAM with ECC error detection and correction operating over three independent DDR3 channels (see *Figure 2-1*, page 2-3).
- Tundra Tsi148 PCI-X-to-VME interface
- Two Front-Panel-accessible XMC/PMC Module Slots
- AMI UEFI (United Extended Firmware Interface) with Diagnostic Extension Option
- Battery backup for TOD/NVRAM
- Front-Panel System LEDs and I/O Ports
- PCI and PCI-*Express* expansion capabilities
- Compact Flash card slot
- Multiple I/O ports through rear VME P2 connector

The XV2 Front Panel I/O connectors—divided between the CPU Board and the I/O Board—are described in *Table 2-1*.

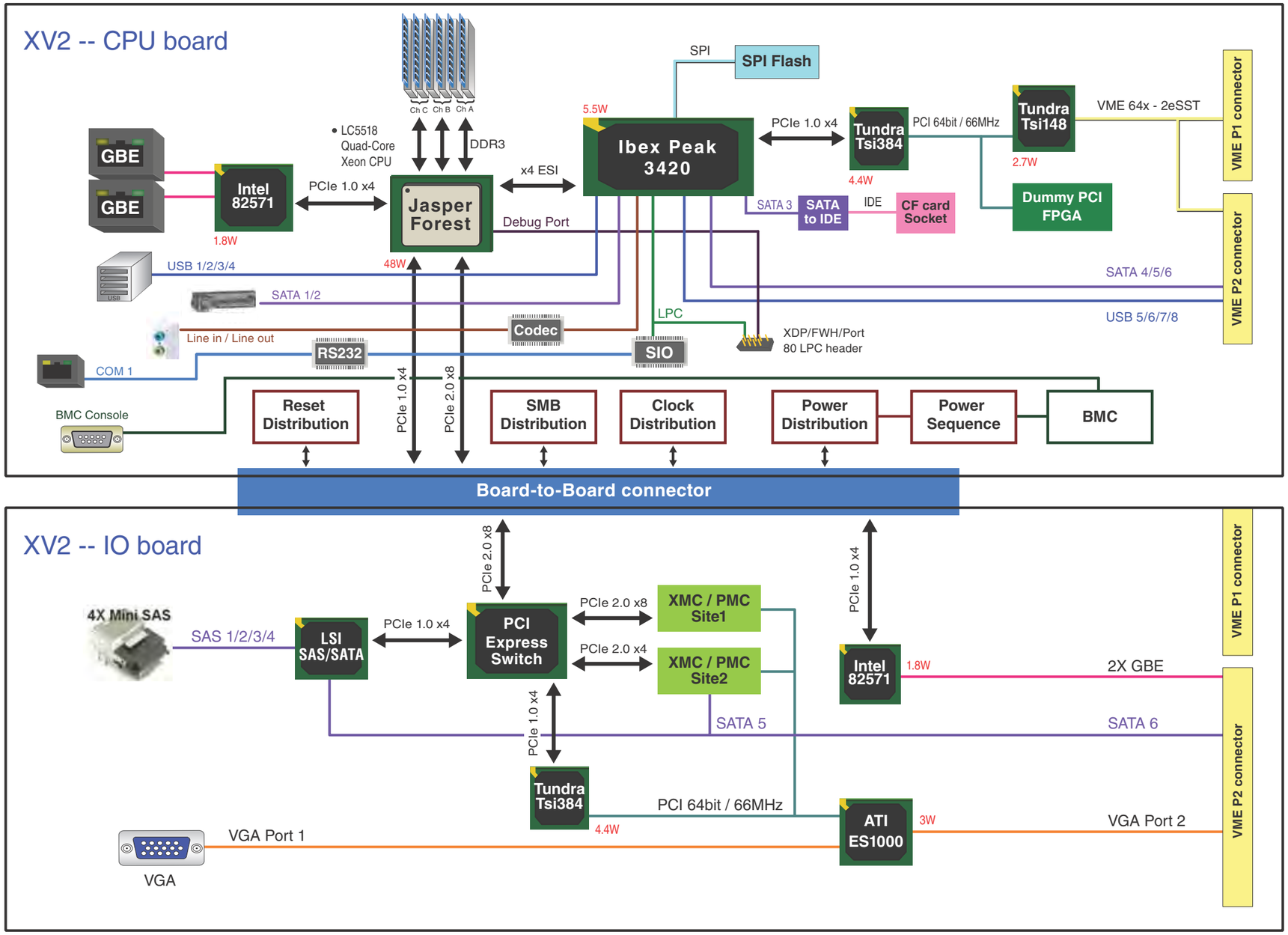
Table 2-1. XV2 Front-Panel I/O Connections

	Connections	Definition
CPU Board	2 LAN ports (RJ45)	Gigabit Ethernet A and Gigabit Ethernet B
	1 BMC port	Micro-DB9 connector
	4 USB ports	USB A, USB B, USB C, and USB D, all with Keyboard/ Mouse support
	1 Serial port (RJ45)	COM1 (Modem Support)
	Dual SATA port	Dual SATA ports A and B
	1 HD Audio line in	High-definition audio (Intel) input and output ports
	1 HD Audio line out	
I/O Board	4 SAS/SATA ports	4-channel SAS or SATA ports
	1 VGA graphics port	Super VGA port
	2 XMC/PMC Modules	I/O cabling dependent on the PMC‘/XMC card installed

Front-Panel connector pinouts and signal definitions are defined in Appendix A, “Connector Pinouts and Signal Descriptions”.

Depending on the availability of 8-GB DIMM DDR3 modules, the XV2 contains up to 24 GB (GigaBytes) of DDR3 SDRAM memory with ECC error detection and correction.

Note: The size and type of XV2 memory should be specified at the time of your order.



Feature Summary

This is a two-VME-slot solution
Due to the power can only draw from standard VME power pins

Can be further expanded with 2PX3 and 3PX3 like LV1

CPU board:

3-channel-DDR3 w/ ECC
Max 12GB with 2Gbit chip
Max 24GB with 4Gbit chip
FP, dual GBE
FP, quad USB ports
FP, single Serial port
FP, reset button
FP, LEDs
FP, dual SATA
FP, Audio Line in / Line out

P2, triple SATA ports
P2, quad USB ports
Onboard, CF card slot

IO board:

FP, one VGA display port
FP, quad mini SAS port
FP, dual XMC/PMC slots
P2, dual GBE
P2, one VGA display port

XV2 Block Diagram
Rev. 005
08/04/2011

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Figure 2-1. XV2 CPU Board and I/O Board Block Diagram

2.2 XMC/PMC Modules

The XV2 I/O Board supports two XMC/PMC slots that are used to install an XMC/PMC Module. The I/O Board has built-in graphics support in the form of an ATI ES1000 2D graphics accelerator, accessed through VGA monitor ports on both the Front Panel and the Paddle Card. For higher-performance graphics support, it is recommended that the user install a Themis T2GPX XMC Graphics Card in one of the XMC/PMC Module slots within the system (through the XV2 I/O Board).

Caution: In order to install an XMC/PMC Module such as the T2GPX XMC Graphics Card (which takes precedence over the on-board ES1000 graphics accelerator), an ATI Radeon device driver (corresponding to the operating system) must be downloaded from an internet site and installed.

Caution: If a T2GPX XMC Graphics Card is installed, the V_AUX power (+5V or +12V) must be supplied through the XV2 I/O Board Paddle Card.

For more information on the T2GPX XMC Graphics Card, call Themis Customer Support at (510) 252-0870.

2.3 Paddle Cards

Two Paddle Cards are available for the XV2 that allows access to the I/O and other signals of the VME P2 backplane by plugging into the P2 slot directly behind the XV2 CPU Board or I/O Board (see Chapter 1, "XV2 Installation" for details).

Paddle Card connector pinouts and signal definitions are defined in Appendix A, “Connector Pinouts and Signal Descriptions”.

Note: If, for some reason, you have a need for a different Paddle-Card design, call Themis Computer for a cost estimate.

2.4 XMC/PMC Carrier Boards

Caution: The original Themis 2P2 XMC/PMC Carrier Board or 2P2/2P3 PMC Carrier Boards physically cannot be installed onto the XV2. A new XMC/PMC Carrier Board is presently being designed, but has not yet been released.

2.5 System Specifications

2.5.1 Processor and Memory Subsystems

Table 2-2 and *Table 2-3* contain processor and memory specifications, respectively.

Table 2-2. Processor Specifications

Feature/Function	Specifications
Processor	Intel LC5518 Quad-Core Xeon CPU
Processor Speed	1.73 GHz QPI Speed = 4.8 GT/s (GigaTransfers/Second)
Instruction Set	64 bit
L1 Cache (Instruction + Data)	64 KB (32 KB + 32 KB)
L2 Cache	12 MB
L3 Cache	8 MB

Table 2-3. Memory Specifications

Feature/Function	Specifications
Main Memory	Total size = 24 GB (depending on the availabilty of 8-GB DDR3 modules)
Memory Type	VLP (Very Low Profile) DDR3 SDRAM memory module

2.5.2 Operating Systems

Supported operating systems include Microsoft Windows and Linux.

2.5.3 Auxiliary Functions

Table 2-4 summarizes the functional specifications of the XV2 auxiliary functions. These specifications apply to all product configurations.

Table 2-4. Auxiliary Functions Specifications

Feature/Function	Specifications
UEFI SPI (Serial Peripheral Interface) Flash Memory	Total of 4 MB
NVRAM/TOD	256 Byte, battery-backed CMOS RAM plus timekeeper
System Status LEDs	Four (4) LEDs located on Front Panel of the CPU Board [See *Figure C-3*, page C-5, Appendix C, “Front-Panel I/O Connections and LEDs”]
VME Status LEDs	Four (4) LEDs located on Front Panel of the CPU Board [See *Figure C-3*, page C-5, Appendix C, “Front-Panel I/O Connections and LEDs”]
Reset Switch	Momentary Push-button —Generate System Reset or Soft Reset Located on the Front Panel
Voltage Sensors	Monitor all the on-board power rails
Temperature Sensors	Monitor the CPU die and DIMM temperature

2.6 Environmental Specifications

Table 2-5. XV2 Environmental Specifications

Parameter	Operating		Non-Operating	
Temperature Range	–5° to 55° C		–40° to 80° C	
Humidity Range [a] Relative non-condensing at 104°F (40°C)	0% to 90%		0% to 90%	
Altitude Range	0 to 10,000 feet		0 to 30,000 feet	
Shock	30G @20 msec (Half-Sine), 3 pulses each axis		30G @20 msec (Half-Sine), 3 pulses each axis	
Random Vibration Levels *Duration:* Test levels shall be applied for one hour in each test axis.	*Frequency*	*Vibration*	*Frequency*	*Vibration*
	10 Hz	0.03 g^2 / Hz	10 Hz	0.04 g^2 / Hz
			40 Hz	0.04 g^2 / Hz
	100 Hz	0.025 g^2 / Hz	100 Hz	0.005 g^2 / Hz
	200 Hz	0.005 g^2 / Hz		
	300 Hz	0.0015 g^2 / Hz		
	400 Hz	0.001 g^2 / Hz		
	500 Hz	0.0005 g^2 / Hz		
	750 Hz	0.0003 g^2 / Hz		
	1000 Hz	0.0001 g^2 / Hz	1000 Hz	0.005 g^2 / Hz
			2000 Hz	0.001 g^2 / Hz
	Note: grms = 2.0		*Note:* grms = 2.97	
Electrostatic Discharge	15 kV		15 kV	

a—A non-condensing environment must be maintained at all times. Themis recommends that the board be operational (powered on) and temperature stabilized before and during humidity testing.

2.7 Regulatory Compliance

Table 2-6. XV2 Regulatory Compliance

Parameter	Specification
Shock	MIL-STD-901D
Vibration	MIL-STD-810F
PCB FAB Material	94VO
Restriction of Hazardous Substances (RoHS)	European Directive 2002/95/EC

2.8 Nominal Power Requirements

Nominal XV2 power requirements for 12-GB Memory Modules are listed in *Table 2-7* (based on DDR3 SDRAM memory modules).

Table 2-7. Nominal XV2 Power Requirements, 12-GB Memory Modules

Nominal Voltage, 60º C	System Idle, Linux OS		System Running, Built-In Test (BIT)	
	Current	Power (watts)	Current	Power (watts)
+12 volts	1.5 A	18.165 W	1.8 A	21.6540 W
+5 volts	5.6 A	27.916 W	8.6 A	42.7592 W
Total:		46.081 W		64.4132 W

Overview Section

Chapter 3

Hardware Overview

The following sections provide a description of the major components of the XV2.

3.1 CPU Board

For a block diagram of XV2 CPU Board components, consult *Figure 2-1*, page 2-3, in Chapter 2, "XV2 Features and Specifications".

3.1.1 Intel LC5518 Quad-Core Xeon Processor

The Central Processing Unit (CPU) used in the XV2 is the Intel LC5518 Quad-Core Xeon processor, available at an operating speed of 1.73 GHz. It is supported by an L1 cache of 64 KB (32-KB for instructions; 32-KB for data), and an L2 cache of 12 MB.

The Intel LC5518 Xeon architecture enables the system to use a wide range of peripherals and high-performance operating systems, including Linux and Microsoft Windows.

For details on the Intel LC5518 Xeon processor, refer to the Intel website at http://www.intel.com/.

3.1.2 Intel 3420 Platform Controller Hub (PCH)

The Intel 3420 Platform Controller Hub (PCH)—formerly Ibex Peak—supports

development with high-performance, low-power Intel multi-core processors, and allows bladed and dense-bladed system designs to fit within a maximum 200-watt power envelope.

The 3420 PCH is ideal for a wide range of applications, including storage area networks (SANs), network-attached storage (NAS), routers, medical imaging equipment, military signal and image processing, and telecommunications servers.

Features include:

- Direct Media Interface (10 Gb/s each direction, full duplex)
- PCI Express (including PCI-Express root ports, 2.5 GT/s, and support for full 2.5 Gb/s bandwidth in each direction per x1 lane)
- PCI Bus Interface
- Integrated Serial ATA (SATA) Host Controller
- External SATA support
- Intel Rapid Storage Technology
- Intel High-Definition Audio Interface
- Intel Quiet System Technology
- Simple Serial Transport (SST) 1.0 Bus and Platform Environmental Control Interface (PECI)
- USB 2.0
- Integrated Gigabit LAN Controller
- Power Management Logic
- External Glue Integration
- Enhanced DMA Controller

3.1.3 82571EB Dual Gigabit Ethernet Controller

The Intel 82571EB Gigabit Ethernet Controller is a single, compact component with two fully integrated Gigabit Ethernet Media Access Control (MAC) and physical layer (PHY) ports. This device uses the PCI Express architecture (Rev. 1.0a), and enables a dual-port Gigabit Ethernet implementation in a very small area. This is useful for server and workstation network designs with critical space constraints. The Intel 82571EB Gigabit Ethernet Controller provides two IEEE 802.3 Ethernet interfaces for 10/100/1000 Base-T applications. Both ports also integrate a Serializer-Deserializer (SerDes) to support 1000Base-SX or 1000Base-LX (optical fiber) and Gigabit backplane applications. In addition to managing MAC and PHY Ethernet layer functions, the controller manages PCI Express packet traffic across its transaction, link, and physical/logical layers.

Other features include:

- Wide internal data paths efficiently handle large address and data words
- Combined parallel and pipelined logic architecture efficiently handles packets with minimum latency
- Advanced interrupt-handling features and efficient ring-buffer descriptor data structures, with up to 64 packet descriptors cached on chip
- Offloads tasks from the host, such as checksum calculations for Transmission Control Protocol (TCP), User Datagram Protocol (UDP), and Internet Protocol (IP)

3.1.4 WPCD374L Super I/O (SIO) Controller

The Nuvotron WPCD374L Super I/O Controller is a 3.3-volt compliant Super I/O controller with an LPC interface that includes hardware monitoring capability, enhanced security features, power control logic, and motherboard glue logic. Its hardware monitoring capability includes temperature, voltage, and fan-speed monitoring, and it can alert the system to out-of-limit conditions and automatically control the speeds of multiple fans.

Other features include:

- Support for monitoring two external temperatures via thermal diode inputs and an internal sensor to measure ambient temperature
- Complete legacy Super I/O functionality, including 8042=-based KB/M controller, IEEE 1284, EPP, and ECP-compatible parallel port, serial port, IR port, and floppy-disk controller
- ACPI 1.0/2.0 compatibility, therefore supports multiple low power-down modes
- Support for the ISA Plug-and-Play Standard register set (v1.0a)

3.1.5 Tundra Tsi148 PCI/X-to-VME Bridge

The Tundra Tsi148 PCI/X-to-VME Bridge is fully compliant with the 2eSST and VME64 Extension standards. It increases a system's usable bus bandwidth because its local bus interface is designed for the next-generation PCI-X processors and peripherals that support either a 66MHz PCI bus or a 133-MHz PCI-X bus interface.

- Full VMEbus system controller functionality
- Interrupt and interrupt-handling capability
- Flexible register set; programmable from both the PCI-X bus and VMEbus
- Fully compliant, programmable PCI or PCI-X bus interface

- 64-bit data path
- Multiple modes of bus operation
  - — PCI-X operates from 50 to 133 MHz
  - — PCI bus operates from 33 to 66 MHz
- 32-bit or 64-bit addressing and data in PCI and PCI-X modes
- Two programmable DMA controllers with Direct mode and Linked-List mode support
- IEEE 1149.1 interface
- 456 PBGA package

3.1.6 Realtek ALC262 High-Definition Audio Codec

The ALC262 series are 4-Channel DAC and 6-Channel ADC high-definition Audio Codecs with UAA (Universal Audio Architecture), and features two 24-bit stereo DACs and three 24-bit stereo ADCs designed for high-performance multimedia desktop and laptop systems. It incorporates proprietary converter technology to achieve over 100dB signal-to-noise ratio playback quality.

Hardware features include:

- High-performance DACs with 100dB SNR
- ADCs with 90dB SNR (A-weighting)
- Meets WLP (Windows Logo Program) 3.10 and future WLP requirements
- Two stereo DACs support 16/20/24-bit PCM for stereo audio playback on the rear panel, plus 2 channels of independent stereo sound output (multiple streaming) through the Front-Out-Left and Front-Out-Right channels
- Up to four channels of microphone input are supported for AEC/BF applications

Software features include:

- Meets Microsoft Windows Logo Program requirements
- EAX™ 1.0 and 2.0 compatible
- Direct Sound 3D™ compatible
- A3D™ compatible
- Emulation of 26 sound environments to enhance gaming experience
- Multi-band software equalizer and tools

3.1.7 Programmable Logic

Programmable logic is supported by an FPGA (Field-Programmable Gate Array) device installed on the XV2.

The FPGA resides on the PCI bus and is the conduit to the GPIO, BIOS flash, status LEDs, configuration and resistor jumpers, and the buffer control switch.

3.2 XMC/PMC Carrier Boards

Caution: The original Themis 2P2 XMC/PMC Carrier Board or 2P2/2P3 PMC Carrier Boards physically cannot be installed onto the XV2. A new XMC/PMC Carrier Board is presently being designed, but has not yet been released.

Appendix A

Connector Pinouts and Signal Descriptions

This appendix describes connector pinouts and their signals for the XV2 and its associated Paddle Card. The XV2 rear connectors, front-panel connectors, and Paddle Card connectors are each presented as individual sections.

A.1 CPU Board—XV2 Rear Connectors

A.1.1 VME P1 Connector (CPU Board)

- *Connector Type:* 3-row, 96 pins (3x32), VME64 (Male)
- *Manufacturer; Part Number:* Harting; 9031966921

The connector pinout for the 3-row, VME P1 connector is shown in *Figure A-1*. Connector-pin signal descriptions are described in *Table A-1* on page A-2.

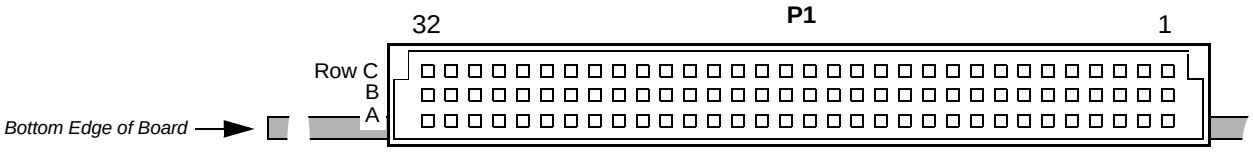


Figure A-1. XV2 CPU Board VME P1 Connector Pinout

Table A-1. XV2 CPU Board VME P1 Connector-Pin Signals

Pin	Row A Signal	Row B Signal	Row C Signal
1	VME_D00	VME_BBSY_L	VME_D08
2	VME_D01	VME_BCLR_L	VME_D09
3	VME_D02	VME_ACFAIL_L	VME_D10
4	VME_D03	VME_BGIN0_L	VME_D11
5	VME_D04	VME_BGOUT0_L	VME_D12
6	VME_D05	VME_BGIN1_L	VME_D13
7	VME_D06	VME_BGOUT1_L	VME_D14
8	VME_D07	VME_BGIN2_L	VME_D15
9	GND	VME_BGOUT2_L	GND
10	VME_SYSCLK	VME_BGIN3_L	VME_SYSFAIL_L
11	GND	VME_BGOUT3_L	VME_BERR_L
12	VME_DS1_L	VME_BR0_L	VME_SYSRESET_L
13	VME_DS0_L	VME_BR1_L	VME_WORD_L
14	VME_WRITE_L	VME_BR2_L	VME_AM5
15	GND	VME_BR3_L	VME_A23
16	VME_DTACK_L	VME_AM0	VME_A22
17	GND	VME_AM1	VME_A21
18	VME_AS_L	VME_AM2	VME_A20
19	GND	VME_AM3	VME_A19
20	VME_IACK_L	GND	VME_A18
21	VME_IACKIN_L	*Not Connected*	VME_A17
22	VME_IACKOUT_L	*Not Connected*	VME_A16
23	VME_AM4	GND	VME_A15
24	VME_A07	VME_IRQ7_L	VME_A14
25	VME_A06	VME_IRQ6_L	VME_A13
26	VME_A05	VME_IRQ5_L	VME_A12
27	VME_A04	VME_IRQ4_L	VME_A11
28	VME_A03	VME_IRQ3_L	VME_A10
29	VME_A02	VME_IRQ2_L	VME_A09
30	VME_A01	VME_IRQ1_L	VME_A08
31	–12V	*Not Connected*	+12V
32	VCC	VCC	VCC

_L Indicates an active low.

A.1.2 VME P2 Connector (CPU Board)

- *Connector Type: 3*-row, 96 pins (3x32), VME64 (Male)
- *Manufacturer; Part Number:* Harting; 9031966921

The connector pinout for the 3-row XV2 CPU Board VME P2 connector is shown in *Figure A-2*. Connector-pin signals routed to the P2 connector are described in *Table A-2* on page A-4. To access these P2 connector signals, a XV2 VME P2 Paddle Card (purchased separately) must be attached to the P2 backplane behind the XV2 (refer to Section A.5.2, “XMC Connectors,” on page A-24).

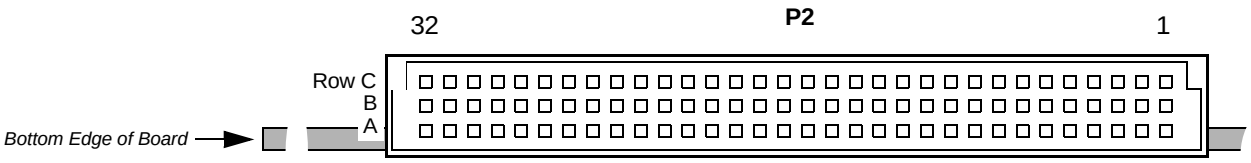


Figure A-2. XV2 CPU Board VME P2 Connector Pinout

VME P2-connector pinouts signal assignments vary with the board jumper-resistor configurations (refer to Appendix B, “Jumper Pins and Solder Beads” for details).

Note: In *Table A-2*,

- an **_L** indicates an active low
- **(–)** and **(+)** indicate one member of a signal pair
- a **thick border** groups associated signals

Table A-2. XV2 CPU Board VME P2 Connector-Pin Signals

Pin	Row A Signal	Row B Signal	Row C Signal
1	PWR_EN	VCC (+5V)	**USB4P**
2	TPS85	GND	**USB4N**
3	*Not Connected*	VME_RETRY_L	**USB3P**
4	GND	VME_A[24]	**USB3N**
5	*Not Connected*	VME_A[25]	**OC_USB4_P2_L**
6	GND	VME_A[26]	**OC_USB3_P2_L**
7	*Not Connected*	VME_A[27]	**OC_USB6_P2_L**
8	GND	VME_A[28]	**OC_USB7_P2_L**
9	**SATA3_TX_P**	VME_A[29]	*Not Connected*
10	**SATA3_TX_N**	VME_A[30]	*Not Connected*
11	**SATA3_RX_P**	VME_A[31]	**PS2_KB_CLK**
12	**SATA3_RX_N**	GND	**PS2_KB_DATA**
13	GND	VCC (+5V)	**PS2_MS_CLK**
14	**SATA4_TX_P**	VME_D[16]	**PS2_MS_DATA**
15	**SATA4_TX_N**	VME_D[17]	SMB_CPU_BRD_SDA
16	**SATA4_RX_P**	VME_D[18]	SMB_CPU_BRD_SCL
17	**SATA4_RX_N**	VME_D[19]	HDA_RST_L
18	GND	VME_D[20]	HDA_SYNC
19	**SATA5_TX_P**	VME_D[21]	HDA_BIT_CLK
20	**SATA5_TX_N**	VME_D[22]	HDA_SDIN3
21	**SATA5_RX_P**	VME_D[23]	HDA_SDOUT
22	**SATA5_RX_N**	GND	**USB6P**
23	GND	VME_D[24]	**USB6N**
24	GND	VME_D[25]	**USB7P**
25	*Not Connected*	VME_D[26]	**USB7N**
26	GND	VME_D[27]	*Not Connected*
27	*Not Connected*	VME_D[28]	*Not Connected*
28	GND	VME_D[29]	VIN_AUX
29	*Not Connected*	VME_D[30]	VIN_AUX
30	GND	VME_D[31]	V_3V3
31	*Not Connected*	GND	GND
32	*Not Connected*	VCC (+5V)	ALL_PWRGD

A.2 I/O Board—XV2 Rear Connectors

A.2.1 VME P1 Connector (I/O Board)

- *Connector Type:* 3-row, 96 pins (3x32), VME64 (Male)
- *Manufacturer; Part Number:* Harting; 9031966921

The connector pinout for the 3-row, XV2 I/O Board VME P1 connector is shown in *Figure A-3*. Connector-pin signal descriptions are described in *Table A-3*.

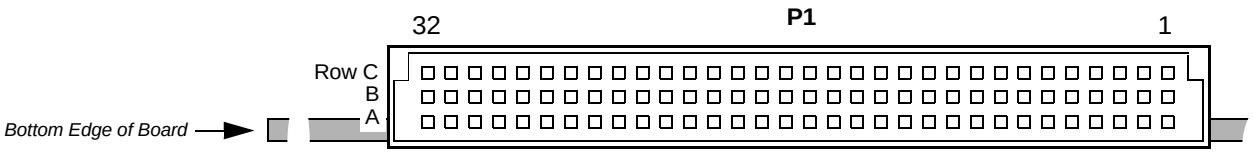


Figure A-3. XV2 I/O Board VME P1 Connector Pinout

Table A-3. XV2 I/O Board VME P1 Connector-Pin Signals

Pin	Row A Signal	Row B Signal	Row C Signal
1	*Not Connected*	VME_BBSY_L	*Not Connected*
2	*Not Connected*	VME_BCLR_L	*Not Connected*
3	*Not Connected*	VME_ACFAIL_L	*Not Connected*
4	*Not Connected*	VME_BG_L0	*Not Connected*
5	*Not Connected*	VME_BG_L0	*Not Connected*
6	*Not Connected*	VME_BG_L1	*Not Connected*
7	*Not Connected*	VME_BG_L1	*Not Connected*
8	*Not Connected*	VME_BG_L2	*Not Connected*
9	GND	VME_BG_L2	GND
10	*Not Connected*	VME_BG_L3	*Not Connected*

Table A-3. XV2 I/O Board VME P1 Connector-Pin Signals (Continued)

Pin	Row A Signal	Row B Signal	Row C Signal
11	GND	VME_BG_L3	*Not Connected*
12	*Not Connected*	*Not Connected*	*Not Connected*
13	*Not Connected*	*Not Connected*	*Not Connected*
14	*Not Connected*	*Not Connected*	*Not Connected*
15	GND	*Not Connected*	*Not Connected*
16	*Not Connected*	*Not Connected*	*Not Connected*
17	GND	*Not Connected*	*Not Connected*
18	*Not Connected*	*Not Connected*	*Not Connected*
19	GND	*Not Connected*	*Not Connected*
20	*Not Connected*	GND	*Not Connected*
21	VME_IACKIN_L	*Not Connected*	*Not Connected*
22	VME_IACKOUT_L	*Not Connected*	*Not Connected*
23	*Not Connected*	GND	*Not Connected*
24	*Not Connected*	*Not Connected*	*Not Connected*
25	*Not Connected*	*Not Connected*	*Not Connected*
26	*Not Connected*	*Not Connected*	*Not Connected*
27	*Not Connected*	*Not Connected*	*Not Connected*
28	*Not Connected*	*Not Connected*	*Not Connected*
29	*Not Connected*	*Not Connected*	*Not Connected*
30	*Not Connected*	*Not Connected*	*Not Connected*
31	–12V	*Not Connected*	+12V
32	VCC (5V)	VCC (5V)	VCC (5V)

_L Indicates an active low.

A.2.2 VME P2 Connector (I/O Board)

- *Connector Type:* 3-row, 96 pins (3x32), VME64 (Male)
- *Manufacturer; Part Number:* Harting; 9031966921

The connector pinout for the 3-row XV2 I/O Board VME P2 connector is shown in *Figure A-2*. Connector-pin signals routed to the P2 connector are described in *Table A-2* on page A-4. To access these P2 connector signals, a XV2 VME P2 Paddle Card (purchased separately) must be attached to the P2 backplane behind the XV2 (refer to Section A.5.2, “XMC Connectors,” on page A-24).

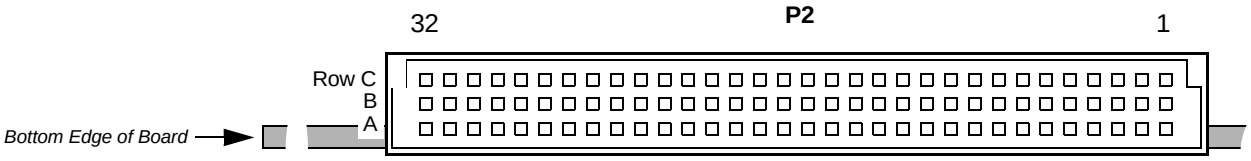


Figure A-4. XV2 I/O Board VME P2 Connector Pinout

VME P2-connector pinouts signal assignments vary with the board jumper-resistor configurations (refer to Appendix B, “Jumper Pins and Solder Beads” for details).

Note: In *Table A-2*,

- an **_L** indicates an active low
- **(–)** and **(+)** indicate one member of a signal pair
- a **thick border** groups associated signals

Table A-4. I/O Board XV2 VME P2 Connector-Pin Signals

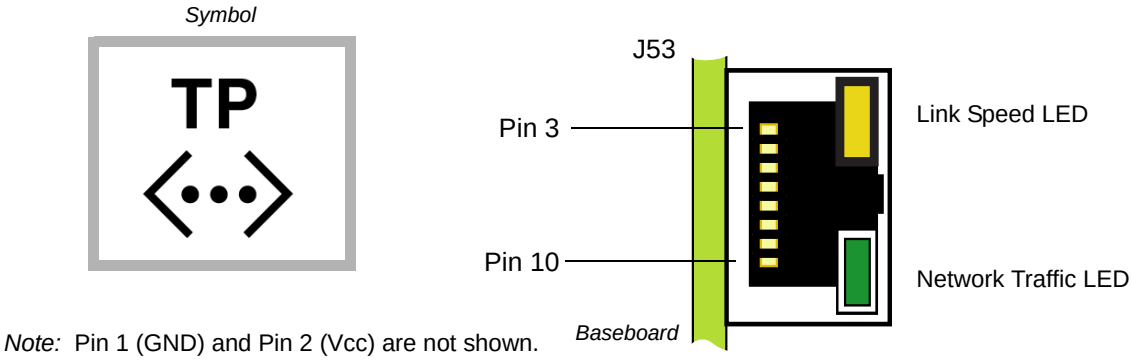
Pin	Row A Signal	Row B Signal	Row C Signal
1	PWR_EN_L	VCC (+5V)	GND
2	GND	GND	**LAN_D_MDI_N0**
3	**VGA2_RED**	*Not Connected*	**LAN_D_MDI_P0**
4	GND	*Not Connected*	GND
5	**VGA2_GREEN**	*Not Connected*	**LAN_D_MDI_N1**
6	GND	*Not Connected*	**LAN_D_MDI_P1**
7	**VGA2_BLUE**	*Not Connected*	GND
8	GND	*Not Connected*	**LAN_D_MDI_N2**
9	**HSYNC2**	*Not Connected*	**LAN_D_MDI_P2**
10	GND	*Not Connected*	GND
11	**VSYNC2**	*Not Connected*	**LAN_D_MDI_N3**
12	GND	GND	**LAN_D_MDI_P3**
13	**VGA2_DDC_DAT**	VCC (+5V)	GND
14	GND	*Not Connected*	**LAN_C_MDI_N0**
15	**VGA2_DDC_CLK**	*Not Connected*	**LAN_C_MDI_P0**
16	GND	*Not Connected*	GND
17	**SAS_DISK6_TX_P**	*Not Connected*	**LAN_C_MDI_N1**
18	**SAS_DISK6_TX_N**	*Not Connected*	**LAN_C_MDI_P1**
19	GND	*Not Connected*	GND
20	**SAS_DISK6_RX_P**	*Not Connected*	**LAN_C_MDI_N2**
21	**SAS_DISK6_RX_N**	*Not Connected*	**LAN_C_MDI_P2**
22	GND	GND	GND
23	V_3V3	*Not Connected*	**LAN_C_MDI_N3**
24	GND	*Not Connected*	**LAN_C_MDI_P3**
25	V_VIN_AUX	*Not Connected*	GND
26	GND	*Not Connected*	V_1V8
27	V_VIN_AUX	*Not Connected*	**LAN_LINKD100_L**
28	GND	*Not Connected*	**LAN_LINKD1000_L**
29	V_VIN_AUX	*Not Connected*	**LAN_ACTD_L**
30	GND	*Not Connected*	**LAN_LINKC100_L**
31	V_VIN_AUX	GND	**LAN_LINKC1000_L**
32	V_VIN_AUX	VCC (+5V)	**LAN_ACTC_L**

A.3 XV2 Front-Panel Connectors

A.3.1 CPU Board—Gigabit Ethernet (GbE) Ports A and B

- *Connector Type:* Dual RJ45 GbE Connector, 16 Pin, 4 LEDs, 2 transformers
- *Manufacturer; Part Number:* Pulse; J0G-0009NL

The XV2 provides dual Gigabit Ethernet ports (A and B) on its Front Panel. Each RJ45 (8-pin) GbE connector contains two embedded LEDs, supports 10/100/1000Base-T transmission (see *Figure A-5* and *Table A-5* below), and has an embedded transformer for signal conversion.



Note: Pin 1 (GND) and Pin 2 (Vcc) are not shown.

Figure A-5. Gigabit Ethernet RJ45 Pinout—Port A (Top) and Port B (Bottom)

Table A-5. Gigabit Ethernet Connector-Pin Signals and LED Interpretation

Pin	Port A Signal	Description (MDI = Medium-Dependent Interface)	Port B Signal	Description
10	MDI_0–	Bi-directional pair A–	MDI_0–	Bi-directional pair A–
9	MDI_0+	Bi-directional pair A+	MDI_0+	Bi-directional pair A+
8	MDI_1–	Bi-directional pair B–	MDI_1–	Bi-directional pair B–
7	MDI_1+	Bi-directional pair B+	MDI_1+	Bi-directional pair B+
6	MDI_2–	Bi-directional pair C–	MDI_2–	Bi-directional pair C–
5	MDI_2+	Bi-directional pair C+	MDI_2+	Bi-directional pair C+
4	MDI_3–	Bi-directional pair D–	MDI_3–	Bi-directional pair D–
3	MDI_3+	Bi-directional pair D+	MDI_3+	Bi-directional pair D+

LED	LED Color	Interpretation
Green/Amber (*Top*) = Link Speed	OFF	10 Mb/s
	Green	100 Mb/s
	Amber	1000 Mb/s
Green (*Bottom*) = Network Traffic	Flashing rate is 300 ms for transmit/receive activity.	

A.3.2 CPU Board—BMC Port

- *Connector Type:* Single micro-DB9 Connector, 9 Pin
- *Manufacturer; Part Number:* Molex; 836119016

The XV2 provides a single 9-pin connector that supports the BMC (baseboard management controller) on its Front Panel. It is used to control the power-on sequence whenever two or more XV2 systems are installed in the same VME rack chassis.

A connector pinout for the BMC connector is shown in *Figure A-6*.

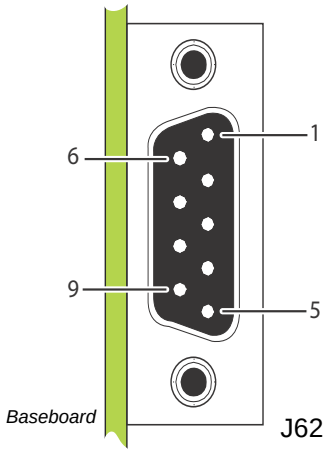


Figure A-6. XV2 BMC Connector Pinout

Connector-pin signals for the BMC connector are described in *Table A-6*.

Table A-6. XV2 BMC Connector-Pin Signals

Pin	Signal
1	*No Connection*
2	SER_DB9_ RXD
3	SER_DB9_TXD
4	*No Connection*
5	GND
6	*No Connection*
7	*No Connection*
8	*No Connection*
9	*No Connection*

A.3.3 CPU Board—USB Ports A, B, C, and D

- *Connector Type:* Dual (stacked) USB Connector, 4 Pins each port, 8 Pins total
- *Manufacturer; Part Number:* Amp; 5787617-4

The XV2 supports four USB ports (stacked A/B and stacked C/D) on its Front Panel.

The connector pinout for a dual USB connector is shown in *Figure A-7*.

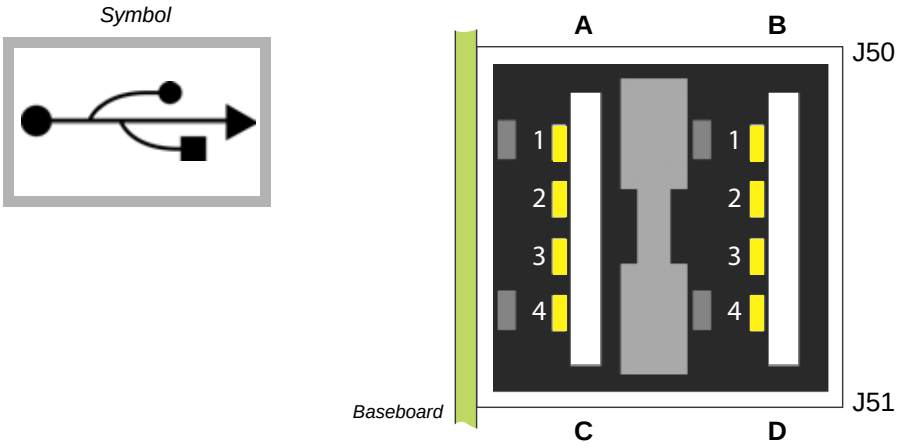


Figure A-7. XV2 Dual USB Connector Pinout

Connector-pin signals for the dual USB connector are described in *Table A-7*.

Table A-7. XV2 Dual USB Connector-Pin Signals

USB Port	Pin	Signal
A	A1	V_5V_USB0
	A2	USB0N_FP
	A3	USB0P_FP
	A4	DIN_USB_GND1
B	B1	V_5V_USB1
	B2	USB1N_FP
	B3	USB1P_FP
	B4	DIN_USB_GND2

USB Port	Pin	Signal
C	C1	V_5V_USB2
	C2	USB2N_FP
	C3	USB2P_FP
	C4	DIN_USB_GND3
D	D1	V_5V_USB3
	D2	USB3N_FP
	D3	USB3P_FP
	D4	DIN_USB_GND4

A.3.4 CPU Board—Serial Port COM1

- *Connector Type:* Single RJ45 Connector, 8 Pin
- *Manufacturer; Part Number:* Tyco; 5406299-1

Wired as a full “Cisco-style” RS232 port (hence LEDs are not supported), serial port COM1 is supported by an RJ45 connector with a pinout as shown in *Figure A-8*.

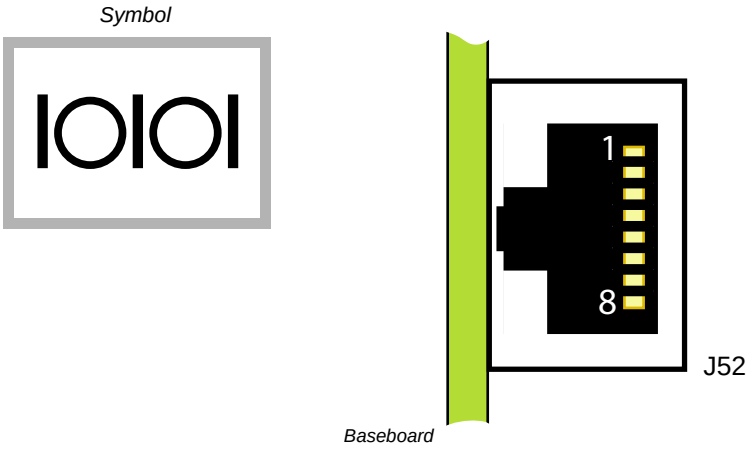


Figure A-8. XV2 Serial Port COM1 RJ45 Connector Pinout

Connector-pin signals for XV2 Serial Port COM1 are described in *Table A-8*.

Table A-8. XV2 Serial Port COM1 RJ45 Connector-Pin Signals

Pin	Signal
1	SIO_RTS_L
2	SIO_DTR_L
3	SIO_TXD
4	GND
5	GND
6	SIO_RXD
7	SIO_DSR_L
8	SIO_CTS_L

A.3.5 CPU Board—SATA Ports A and B

- *Connector Type:* Dual SATA Connector, 7 Pins each, 14 Pins total
- *Manufacturer; Part Number:* Circuit Assembly; CA-D14SAHPR-X-0-5T

A connector pinout for the dual SATA ports A and B is shown in *Figure A-9*.

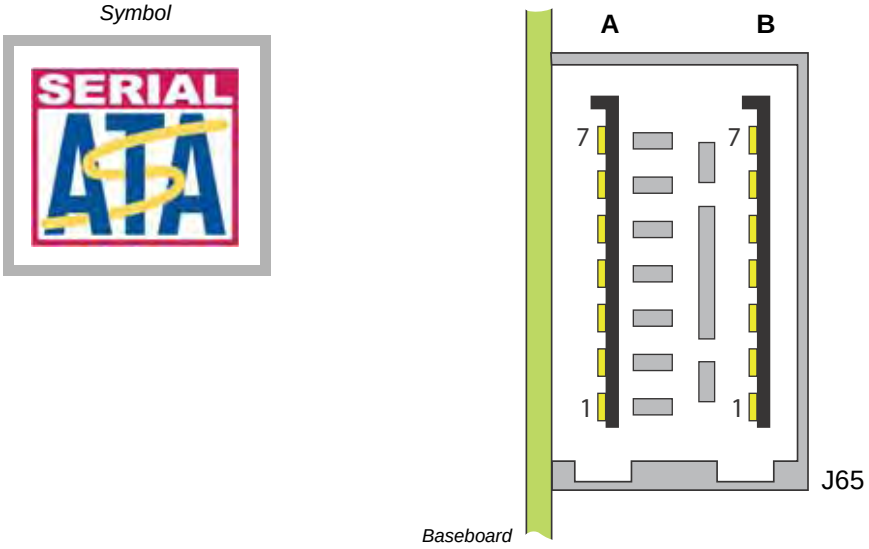


Figure A-9. XV2 Dual SATA Connector Pinout

Connector-pin signals for the XV2 dual SATA connector are described in *Table A-9*.

Table A-9. XV2 Dual SATA Connector-Pin Signals

Pin	Signal
1	GND
2	SATA5_TX_BUF_P
3	SATA5_TX_BUF_N
4	GND
5	SATA5_RX_BUF_N
6	SATA5_RX_BUF_P
7	GND

Pin	Signal
1	GND
2	SATA1_TX_BUF_P
3	SATA1_TX_BUF_N
4	GND
5	SATA1_RX_BUF_N
6	SATA1_RX_BUF_P
7	GND

A.3.6 CPU Board—Stereo Audio In and Audio Out Jacks

- *Connector Type:* TRS 3.5-mm Stereo Connector, 5 Pins, 2 required
- *Manufacturer; Part Number:* Connect Tech; CTP-322-1-LB (Line In), Blue
  Connect Tech; CTP-322-1-LG (Line Out), Green

Two stereo audio jacks are supported on the XV2 Front Panel—Line In and Line Out. Connector-pin signals for the stereo audio jacks are described in *Table A-9*.

Table A-10. XV2 Stereo Audio Connector-Pin Signals

Pin	Signal (Line In, Top), J72
1	GND
2	LINE_IN_L_JACK
3	*No Connection*
4	LINE_IN_R_JACK
5	*No Connection*

Pin	Signal (Line Out, Bottom), J71
1	GND
2	LINE_OUT_L_JACK
3	*No Connection*
4	LINE_OUT_R_JACK
5	*No Connection*

A.3.7 I/O Board—Multiple SAS/SATA Ports

- *Connector Type:* SAS/SATA Connector
- *Manufacturer; Part Number:* Molex; 0755860009

The XV2 I/O Board supports multiple SAS/SATA ports accessed from the Front Panel. On-board circuitry will negotiate the proper protocol (SAS or SATA) after a cable/device has been attached to the SAS/SATA connector. A connector pinout is shown in *Figure A-10*; connector-pin signals are listed in *Table A-11* on page A-15.

Figure A-10. XV2 SAS/SATA Connector Pinout

Table A-11. XV2 SAS/SATA Connector-Pin Signals[a]

Pin	Signal	Pin	Signal
A1	GND	B1	GND
A2	C_SAS_DISK1_RX_P	B2	C_SAS_DISK1_TX_P
A3	C_SAS_DISK1_RX_N	B3	C_SAS_DISK1_TX_N
A4	GND	B4	GND
A5	C_SAS_DISK2_RX_P	B5	C_SAS_DISK2_TX_P
A6	C_SAS_DISK2_RX_N	B6	C_SAS_DISK2_TX_N
A7	GND	B7	GND
A8	C_SAS_DISK3_RX_P	B8	C_SAS_DISK3_TX_P
A9	C_SAS_DISK3_RX_N	B9	C_SAS_DISK3_TX_N
A10	GND	B10	GND
A11	C_SAS_DISK4_RX_P	B11	C_SAS_DISK4_TX_P
A12	C_SAS_DISK4_RX_N	B12	C_SAS_DISK4_TX_N
A13	GND	B13	GND

a—Signal names are given with respect to the SAS Controller.
RX = to Controller; TX = from Controller.

A.3.8 I/O Board—VGA Graphics Port

- *Connector Type:* DE-15F D-sub Connector, 15 Pins (3 x 5)
- *Manufacturer; Part Number:* Kycon; K31X-E15S-NJ

The VGA graphics port is supported by the XV2 I/O Board and accessed from the Front Panel. A connector pinout is shown in *Figure A-11*; connector-pin signals are listed in *Table A-12*.

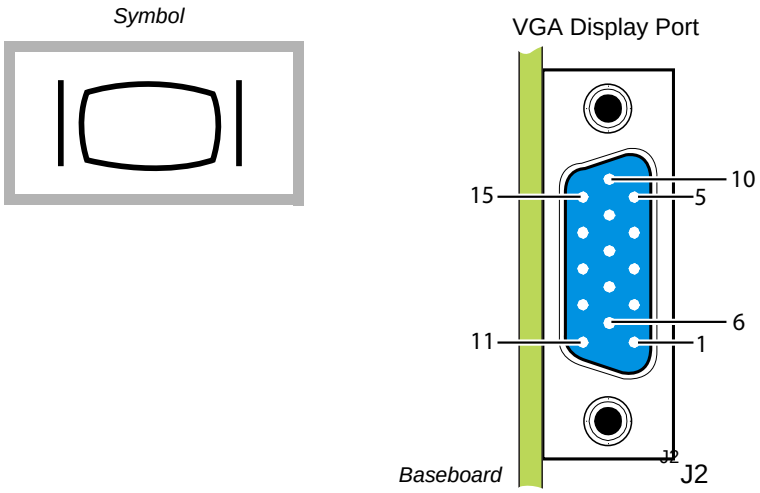


Figure A-11. XV2 VGA Graphics Connector Pinout

Table A-12. XV2 VGA Graphics Connector-Pin Signals

Pin	VGA Signal	Description
1	RED OUT	Red signal output
2	GREEN OUT	Green signal output
3	BLUE OUT	Blue signal output
4	*NC*	No connection
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground

Pin	VGA Signal	Description
9	VCC	Filtered Vcc voltage source
10	GND	Ground
11	*NC*	No connection
12	SDA	Display Data Channel—Data
13	HSYNC	Horizontal synchronization
14	VSYNC	Vertical synchronization
15	SCL	Display Data Channel—Clock

A.4 Push-Button RESET

A recessed push-button RESET switch is located behind the Front Panel of the XV2 and is accessible by inserting an object the size of a paper clip. The RESET switch will initiate a System Reset or Soft Reset, which is propagated throughout the XV2.

A.5 XV2 XMC/PMC Module Card Connectors

A.5.1 PMC Connectors

- *Connector Type:* 2-row x 32-pins, 64-pin connector (Female); six required, three connectors per Module
- *Manufacturer; Part:* TYCO; 5120521-1

Up to two XMC/PMC Module cards can be connected to the top side of the XV2 I/O Board; PMC signals travel through six 64-pin PMC connectors J4 through J9. One card connects to J4, J5, and J6; the other to J7, J8, and J9. They are defined as follows:

- J4, J5 (*Table A-13* and *Table A-14*, respectively).....*32-bit PCI*
- J6 (*Table A-15*).....*64-bit PCI*
- J7, J8 (*Table A-16* and *Table A-17*, respectively).....*32-bit PCI*
- J9 (*Table A-18*).....*64-bit PCI*

The XMC/PMC Module card has no I/O through the VME P2 connector of the XV2 I/O Board. The connector used for XMC/PMC Module card installation is shown in *Figure A-12*; three connectors are required for 64-bit operation, and two connectors for 32-bit operation.

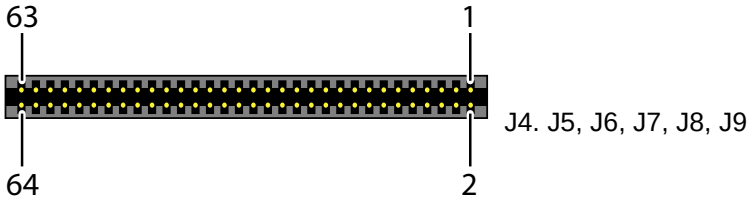


Figure A-12. XV2 PMC Module Card Connector (3 required per Module)

PMC signals (32-bit PCI) for connector J4 are described in *Table A-13*.

Table A-13. XV2 PMC Module Card Connector J4[a] Signals (32 bit)

Pin	Signal	Pin	Signal
1	PMC1_TCK	2	V_12VN
3	Ground	4	PCI_INTA_L (INTC_L)
5	PCI_INTD_L	6	PCI_INTC_L (INTA_L)
7	PMC1_BUSMODE_L1	8	V_5V
9	PCI_INTB_L	10	*No Connection*
11	Ground	12	*No Connection*
13	CLK_66MHZ_PMC1	14	Ground
15	Ground	16	PCI_GNT_L0
17	PCI_REQ_L0	18	V_5V
19	V_3V3	20	PCI_AD[31]
21	PCI_AD[28]	22	PCI_AD[27]
23	PCI_AD[25]	24	Ground
25	Ground	26	PCI_CBE_L3
27	PCI_AD[22]	28	PCI_AD[21]
29	PCI_AD[19]	30	V_5V
31	V_3V3	32	PCI_AD[17]
33	PCI_FRAME_L	34	Ground
35	Ground	36	PCI_IRDY_L
37	PCI_DEVSEL_L	38	V_5V
39	PCI_PCIXCAP	40	PCI_LOCK_L
41	PMC1_SDONE_PU	42	PMC1_SBO_PU
43	PCI_PAR	44	Ground
45	V_3V3	46	PCI_AD[15]
47	PCI_AD[12]	48	PCI_AD[11]
49	PCI_AD[09]	50	V_5V
51	Ground	52	PCI_CBE_L0
53	PCI_AD[06]	54	PCI_AD[05]
55	PCI_AD[04]	56	Ground
57	V_3V3	58	PCI_AD[03]
59	PCI_AD[02]	60	PCI_AD[01]
61	PCI_AD[0]	62	V_5V
63	Ground	64	PCI_REQ64_L

a—Connector J4 corresponds to the PMC standard Jn1.

PMC signals (32-bit PCI) for connector J5 are described in *Table A-14*.

Table A-14. XV2 PMC Module Card Connector J5[a] Signals (32 bit)

Pin	Signal	Pin	Signal
1	V_12V	2	PMC1_TRST_L
3	PMC1_TMS	4	*No Connection*
5	PMC1_TDI	6	Ground
7	Ground	8	*No Connection*
9	*No Connection*	10	*No Connection*
11	PMC1_BUSMODE_L2	12	V_3V3
13	PCI_RST_L	14	PMC1_BUSMODE_L3
15	V_3V3	16	PMC1_BUSMODE_L4
17	*No Connection*	18	Ground
19	PCI_AD[30]	20	PCI_AD[29]
21	Ground	22	PCI_AD[26]
23	PCI_AD[24]	24	V_3V3
25	IDSEL_PMC1	26	PCI_AD[23]
27	V_3V3	28	PCI_AD[20]
29	PCI_AD[18]	30	Ground
31	PCI_AD[16]	32	PCI_CBE_L2
33	Ground	34	*No Connection*
35	PCI_TRDY_L	36	V_3V3
37	Ground	38	PCI_STOP_L
39	PCI_PERR_L	40	Ground
41	V_3V3	42	PCI_SERR_L
43	PCI_CBE_L1	44	Ground
45	PCI_AD[14]	46	PCI_AD[13]
47	PCI_M66EN	48	PCI_AD[10]
49	PCI_AD[08]	50	V_3V3
51	PCI_AD[07]	52	*No Connection*
53	V_3V3	54	*No Connection*
55	*No Connection*	56	Ground
57	*No Connection*	58	*No Connection*
59	Ground	60	*No Connection*
61	PCI_ACK64_L	62	V_3V3
63	Ground	64	*No Connection*

a—Connector J5 corresponds to the PMC standard Jn2.

PMC signals (64-bit PCI) for connector J6 are described in *Table A-15*.

Table A-15. XV2 PMC Module Card Connector J6[a] Signals (64 bit)

Pin	Signal	Pin	Signal
1	*No Connection*	2	Ground
3	Ground	4	PCI_CBE_L7
5	PCI_CBE_L6	6	PCI_CBE_L5
7	PCI_CBE_L4	8	Ground
9	V_3V3	10	PCI_PAR64
11	PCI_AD[63]	12	PCI_AD[62]
13	PCI_AD[61]	14	Ground
15	Ground	16	PCI_AD[60]
17	PCI_AD[59]	18	PCI_AD[58]
19	PCI_AD[57]	20	Ground
21	V_3V3	22	PCI_AD[56]
23	PCI_AD[55]	24	PCI_AD[54]
25	PCI_AD[53]	26	Ground
27	Ground	28	PCI_AD[52]
29	PCI_AD[51]	30	PCI_AD[50]
31	PCI_AD[49]	32	Ground
33	Ground	34	PCI_AD[48]
35	PCI_AD[47]	36	PCI_AD[46]
37	PCI_AD[45]	38	Ground
39	V_3V3	40	PCI_AD[44]
41	PCI_AD[43]	42	PCI_AD[42]
43	PCI_AD[41]	44	Ground
45	Ground	46	PCI_AD[40]
47	PCI_AD[39]	48	PCI_AD[38]
49	PCI_AD[37]	50	Ground
51	Ground	52	PCI_AD[36]
53	PCI_AD[35]	54	PCI_AD[34]
55	PCI_AD[33]	56	Ground
57	V_3V3	58	PCI_AD[32]
59	*No Connection*	60	*No Connection*
61	*No Connection*	62	Ground
63	Ground	64	*No Connection*

a—Connector J6 corresponds to the PMC standard Jn3.

PMC signals (32-bit PCI) for connector J7 are described in *Table A-16*.

Table A-16. XV2 PMC Module Card Connector J7[a] Signals (32 bit)

Pin	Signal	Pin	Signal
1	PMC2_TCK	2	V_12VN
3	Ground	4	PCI_INTA_L (INTB_L)
5	PCI_INTC_L	6	PCI_INTC_L (INTD_L)
7	PMC2_BUSMODE_L1	8	V_5V
9	PCI_INTA_L	10	*No Connection*
11	Ground	12	*No Connection*
13	CLK_66MHZ_PMC2	14	Ground
15	Ground	16	PCI_GNT_L1
17	PCI_REQ_L1	18	V_5V
19	V_3V3	20	PCI_AD[31]
21	PCI_AD[28]	22	PCI_AD[27]
23	PCI_AD[25]	24	Ground
25	Ground	26	PCI_CBE_L3
27	PCI_AD[22]	28	PCI_AD[21]
29	PCI_AD[19]	30	V_5V
31	V_3V3	32	PCI_AD[17]
33	PCI_FRAME_L	34	Ground
35	Ground	36	PCI_IRDY_L
37	PCI_DEVSEL_L	38	V_5V
39	PCI_PCIXCAP	40	PCI_LOCK_L
41	PMC2_SDONE_PU	42	PMC2_SBO_PU
43	PCI_PAR	44	Ground
45	V_3V3	46	PCI_AD[15]
47	PCI_AD[12]	48	PCI_AD[11]
49	PCI_AD[09]	50	V_5V
51	Ground	52	PCI_CBE_L0
53	PCI_AD[06]	54	PCI_AD[05]
55	PCI_AD[04]	56	Ground
57	V_3V3	58	PCI_AD[03]
59	PCI_AD[02]	60	PCI_AD[01]
61	PCI_AD[0]	62	V_5V
63	Ground	64	PCI_REQ64_L

a—Connector J7 corresponds to the PMC standard Jn1.

PMC signals (32-bit PCI) for connector J8 are described in *Table A-17*.

Table A-17. XV2 PMC Module Card Connector J8[a] Signals (32 bit)

Pin	Signal	Pin	Signal
1	V_12V	2	PMC2_TRST_L
3	PMC2_TMS	4	*No Connection*
5	PMC2_TDI	6	Ground
7	Ground	8	*No Connection*
9	*No Connection*	10	*No Connection*
11	PMC2_BUSMODE_L2	12	V_3V3
13	PCI_RST_L	14	PMC-2_BUSMODE_L3
15	V_3V3	16	PMC-2_BUSMODE_L4
17	*No Connection*	18	Ground
19	PCI_AD[30]	20	PCI_AD[29]
21	Ground	22	PCI_AD[26]
23	PCI_AD[24]	24	V_3V3
25	IDSEL_PMC2	26	PCI_AD[23]
27	V_3V3	28	PCI_AD[20]
29	PCI_AD[18]	30	Ground
31	PCI_AD[16]	32	PCI_CBE_L2
33	Ground	34	*No Connection*
35	PCI_TRDY_L	36	V_3V3
37	Ground	38	PCI_STOP_L
39	PCI_PERR_L	40	Ground
41	V_3V3	42	PCI_SERR_L
43	PCI_CBE_L1	44	Ground
45	PCI_AD[14]	46	PCI_AD[13]
47	PCI_M66EN	48	PCI_AD[10]
49	PCI_AD[08]	50	V_3V3
51	PCI_AD[07]	52	*No Connection*
53	V_3V3	54	*No Connection*
55	*No Connection*	56	Ground
57	*No Connection*	58	*No Connection*
59	Ground	60	*No Connection*
61	PCI_ACK64_L	62	V_3V3
63	Ground	64	*No Connection*

a—Connector J8 corresponds to the PMC standard Jn2.

PMC signals (64-bit PCI) for connector J 9 are described in *Table A-18*.

Table A-18. XV2 PMC Module Card Connectors J9[a] Signals (64 bit)

Pin	Signal	Pin	Signal
1	*No Connection*	2	Ground
3	Ground	4	PCI_CBE_L7
5	PCI_CBE_L6	6	PCI_CBE_L5
7	PCI_CBE_L4	8	Ground
9	V_3V3	10	PCI_PAR64
11	PCI_AD[63]	12	PCI_AD[62]
13	PCI_AD[61]	14	Ground
15	Ground	16	PCI_AD[60]
17	PCI_AD[59]	18	PCI_AD[58]
19	PCI_AD[57]	20	Ground
21	V_3V3	22	PCI_AD[56]
23	PCI_AD[55]	24	PCI_AD[54]
25	PCI_AD[53]	26	Ground
27	Ground	28	PCI_AD[52]
29	PCI_AD[51]	30	PCI_AD[50]
31	PCI_AD[49]	32	Ground
33	Ground	34	PCI_AD[48]
35	PCI_AD[47]	36	PCI_AD[46]
37	PCI_AD[45]	38	Ground
39	V_3V3	40	PCI_AD[44]
41	PCI_AD[43]	42	PCI_AD[42]
43	PCI_AD[41]	44	Ground
45	Ground	46	PCI_AD[40]
47	PCI_AD[39]	48	PCI_AD[38]
49	PCI_AD[37]	50	Ground
51	Ground	52	PCI_AD[36]
53	PCI_AD[35]	54	PCI_AD[34]
55	PCI_AD[33]	56	Ground
57	V_3V3	58	PCI_AD[32]
59	*No Connection*	60	*No Connection*
61	*No Connection*	62	Ground
63	Ground	64	*No Connection*

a—Connector J9 corresponds to the PMC standard Jn3.

A.5.2 XMC Connectors

- *Connector Type:* 6-row x 19-pins, 114-pin connector (Female); two required, one connector per Module
- *Manufacturer; Part:* SAMTEC; ASP-103612-04

Up to two XMC/PMC Module cards can be connected to the top side of the XV2 I/O Board; XMC signals travel through two 76-pin XMC connectors J10 and J11. One card connects to J10; the other to J11 (see *Figure A-13*).

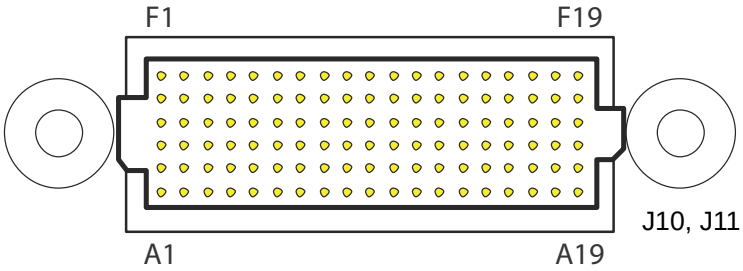


Figure A-13. XV2 XMC Module Card Connector (1 required per Module)

XMC signals for connector J10 are described in *Table A-19*.

Table A-19. XV2 XMC Module Card Connector J10 Signals

Pin	Signal	Pin	Signal	Pin	Signal
A1	PCIe_SW_XMC1_RX0_P	B1	PCIe_SW_XMC1_RX0_N	C1	V_3V3
A2	GND	B2	GND	C2	XMC1_TRST_L
A3	PCIe_SW_XMC1_RX2_P	B3	PCIe_SW_XMC1_RX2_N	C3	V_3V3
A4	GND	B4	GND	C4	XMC1_TCK
A5	PCIe_SW_XMC1_RX4_P	B5	PCIe_SW_XMC1_RX4_N	C5	V_3V3
A6	GND	B6	GND	C6	XMC1_TMS
A7	PCIe_SW_XMC1_RX6_P	B7	PCIe_SW_XMC1_RX6_N	C7	V_3V3
A8	GND	B8	GND	C8	XMC1_TDI
A9	*No Connection*	B9	*No Connection*	C9	*No Connection*
A10	GND	B10	GND	C10	*No Connection*
A11	PCIe_SW_XMC1_TX0_P	B11	PCIe_SW_XMC1_TX0_N	C11	XMC1_MBIST_L

Table A-19. XV2 XMC Module Card Connector J10 Signals (Continued)

Pin	Signal	Pin	Signal	Pin	Signal
A12	GND	B12	GND	C12	XMC1_GA1
A13	PCIe_SW_XMC1_TX2_P	B13	PCIe_SW_XMC1_TX2_N	C13	*No Connection*
A14	GND	B14	GND	C14	XMC1_GA2
A15	PCIe_SW_XMC1_TX4_P	B15	PCIe_SW_XMC1_TX4_N	C15	*No Connection*
A16	GND	B16	GND	C16	XMC1_MVMR0
A17	PCIe_SW_XMC1_TX6_P	B17	PCIe_SW_XMC1_TX6_N	C17	*No Connection*
A18	GND	B18	GND	C18	*No Connection*
A19	CLK_100MHZ_XMC1_P	B19	CLK_100MHZ_XMC1_N	C19	*No Connection*
D1	PCIe_SW_XMC1_RX1_P	E1	PCIe_SW_XMC1_RX1_N	F1	V_VIN_AUX
D2	GND	E2	GND	F2	RESET_XMC1_N
D3	PCIe_SW_XMC1_RX3_P	E3	PCIe_SW_XMC1_RX3_N	F3	V_VIN_AUX
D4	GND	E4	GND	F4	*No Connection*
D5	PCIe_SW_XMC1_RX5_P	E5	PCIe_SW_XMC1_RX5_N	F5	V_VIN_AUX
D6	GND	E6	GND	F6	V_12V
D7	PCIe_SW_XMC1_RX7_P	E7	PCIe_SW_XMC1_RX7_N	F7	V_VIN_AUX
D8	GND	E8	GND	F8	V_12VN
D9	*No Connection*	E9	*No Connection*	F9	V_VIN_AUX
D10	GND	E10	GND	F10	XMC1_GA0
D11	PCIe_SW_XMC1_TX1_P	E11	PCIe_SW_XMC1_TX1_N	F11	V_VIN_AUX
D12	GND	E12	GND	F12	XMC1_PRSNT_L
D13	PCIe_SW_XMC1_TX3_P	E13	PCIe_SW_XMC1_TX3_N	F13	V_VIN_AUX
D14	GND	E14	GND	F14	I2C_XMC1_CONN_SDA
D15	PCIe_SW_XMC1_TX5_P	E15	PCIe_SW_XMC1_TX5_N	F15	V_VIN_AUX
D16	GND	E16	GND	F16	I2C_XMC1_CONN_SCL
D17	PCIe_SW_XMC1_TX7_P	E17	PCIe_SW_XMC1_TX7_N	F17	*No Connection*
D18	GND	E18	GND	F18	*No Connection*
D19	XMC1_WAKE_L	E19	*No Connection*	F19	*No Connection*

XMC signals for connector J11 are described in *Table A-20*.

Table A-20. XV2 XMC Module Card Connector J11 Signals

Pin	Signal	Pin	Signal	Pin	Signal
A1	PCIe_SW_XMC2_RX0_P	B1	PCIe_SW_XMC2_RX0_N	C1	V_3V3
A2	GND	B2	GND	C2	XMC2_TRST_L
A3	PCIe_SW_XMC2_RX2_P	B3	PCIe_SW_XMC2_RX2_N	C3	V_3V3
A4	GND	B4	GND	C4	XMC2_TCK
A5	SAS_DISK5_RX_C_P	B5	SAS_DISK5_RX_C_N	C5	V_3V3
A6	GND	B6	GND	C6	XMC2_TMS
A7	*No Connection*	B7	*No Connection*	C7	V_3V3
A8	GND	B8	GND	C8	XMC2_TDI
A9	*No Connection*	B9	*No Connection*	C9	*No Connection*
A10	GND	B10	GND	C10	*No Connection*
A11	PCIe_SW_XMC2_TX0_P	B11	PCIe_SW_XMC2_TX0_N	C11	XMC2_MBIST_L
A12	GND	B12	GND	C12	XMC2_GA1
A13	PCIe_SW_XMC2_TX2_P	B13	PCIe_SW_XMC2_TX2_N	C13	*No Connection*
A14	GND	B14	GND	C14	XMC2_GA2
A15	SAS_DISK5_TX_C_P	B15	SAS_DISK5_TX_C_N	C15	*No Connection*
A16	GND	B16	GND	C16	XMC2_MVMR0
A17	*No Connection*	B17	*No Connection*	C17	*No Connection*
A18	GND	B18	GND	C18	*No Connection*
A19	CLK_100MHZ_XMC2_P	B19	CLK_100MHZ_XMC2_N	C19	*No Connection*
D1	PCIe_SW_XMC2_RX1_P	E1	PCIe_SW_XMC2_RX1_N	F1	V_VIN_AUX
D2	GND	E2	GND	F2	RESET_XMC2_N
D3	PCIe_SW_XMC2_RX3_P	E3	PCIe_SW_XMC2_RX3_N	F3	V_VIN_AUX
D4	GND	E4	GND	F4	*No Connection*

Table A-20. XV2 XMC Module Card Connector J11 Signals (Continued)

Pin	Signal	Pin	Signal	Pin	Signal
D5	SAS_DISK0_RX_C_P	E5	SAS_DISK0_RX_C_N	F5	V_VIN_AUX
D6	GND	E6	GND	F6	V_12V
D7	*No Connection*	E7	*No Connection*	F7	V_VIN_AUX
D8	GND	E8	GND	F8	V_12VN
D9	*No Connection*	E9	*No Connection*	F9	V_VIN_AUX
D10	GND	E10	GND	F10	XMC2_GA0
D11	PCIe_SW_XMC2_TX1_P	E11	PCIe_SW_XMC2_TX1_N	F11	V_VIN_AUX
D12	GND	E12	GND	F12	XMC2_PRSNT_L
D13	PCIe_SW_XMC2_TX3_P	E13	PCIe_SW_XMC2_TX3_N	F13	V_VIN_AUX
D14	GND	E14	GND	F14	I2C_XMC2_CONN_SDA
D15	SAS_DISK0_TX_C_P	E15	SAS_DISK0_TX_C_N	F15	V_VIN_AUX
D16	GND	E16	GND	F16	I2C_XMC2_CONN_SCL
D17	*No Connection*	E17	*No Connection*	F17	*No Connection*
D18	GND	E18	GND	F18	*No Connection*
D19	XMC2_WAKE_L	E19	*No Connection*	F19	*No Connection*

A.6 XV2 P2 Paddle Cards

The XV2 supports the attachment of two Paddle Cards from behind the VME P2 backplane—the CPU Board Paddle Card and the I/O Board Paddle Card. The following connectors are supported through these respective Paddle Cards.

A.6.1 CPU Board Paddle Card

A.6.1.1 DIN-8 PS/2 Keyboard/Mouse Connector

- *Connector Type:* 8-pin mini-DIN (Female)
- *Manufacturer; Part Number:* TYCO/AMP; 749179-1
- *Themis Cable P/N:* 110104-002

Connector-pin signals for the 8-pin mini-DIN PS/2 port (see *Figure A-14*) on the XV2 CPU Board Paddle Card are given in *Table A-21*.

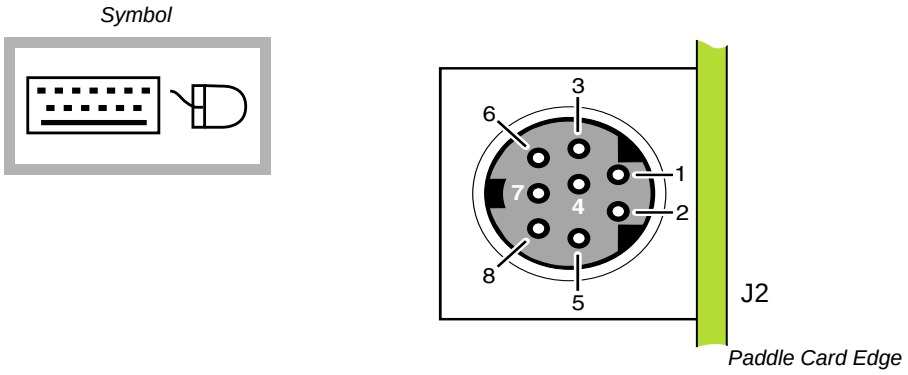


Figure A-14. CPU Board Paddle Card PS/2 Mini-DIN Connector Pinout

Table A-21. CPU Board Paddle Card PS/2 Connector-Pin Signals

Pin	PS/2 Signal	Pin	PS/2 Signal
1	GND (Ground)	5	KBD_CLK
2	GND (Ground)	6	KBD_DATA
3	+5V (Fused, 1.3A max)	7	MOUSE_CLK
4	MOUSE_DATA	8	+5V (Fused, 1.3A max)

A.6.1.2 USB Ports USB3 / USB4 and USB6 / USB7

- *Connector Type:* Type A, Dual Stacked USB
- *Manufacturer; Part:* AMP; 5787617-4

The XV2 CPU Board Paddle Card supports four USB Ports: dual USB3 / USB4 and dual USB6 / USB7, all installed on its front edge. A pinout for these stacked connectors is given in *Figure A-15*, and connector-pin signals are described in *Table A-22*. All USB ports support both version 2.0 and 1.1 standards.

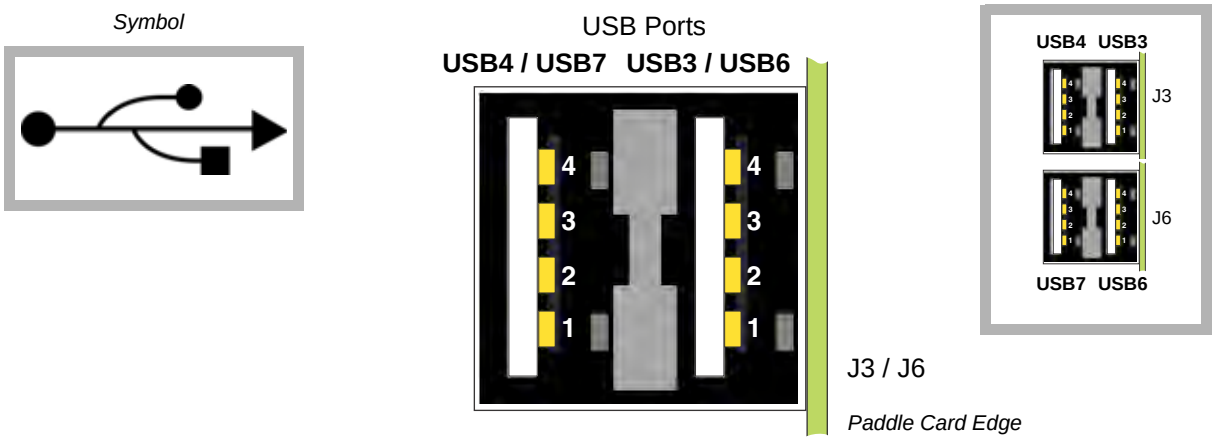


Figure A-15. CPU Board Paddle Card Dual USB Ports 3/4 and 6/7 Connector Pinout

Table A-22. USB Ports 3/4 and 6/7 Connector-Pin Signals

Pin	USB Signal	Description
A1	USB0_PWR	USB C Power
A2	USB0_D_N	USB C Data - Negative
A3	USB0_D_P	USB C Data - Positive
A4	USB0_GND	USB C Ground
B1	USB1_PWR	USB D Power
B2	USB1_D_N	USB D Data - Negative
B3	USB1_D_P	USB D Data - Positive
B4	USB1_GND	USB D Ground

A.6.1.3 SATA Ports 3, 4, and 5

- *Connector Type:* Single 7-pin SATA Plug and Dual 7-pin SATA

- *Manufacturer; Part:* Molex; 47080-4005 (Single) / Circuit Assy; CA-D14SA HPR-C-0-5T (Dual)

Three SATA (Serial ATA) connectors (SATA3, SATA4, SATA5) are installed on the front edge of the XV2 CPU Board CPU Board Paddle Card. A pinout is given in *Figure A-16*, and connector-pin signals are described in *Table A-23*.

Symbol

Note: The SATA4 and SATA5 connectors are joined in a dual assembly.

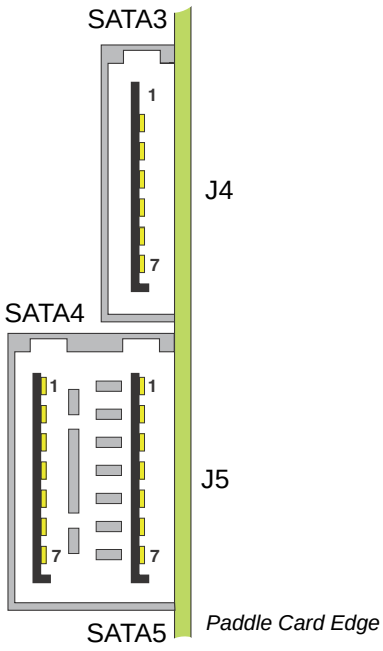


Figure A-16. CPU Board Paddle Card SATA Connector Pinout

Table A-23. CPU Board Paddle Card SATA Connector-Pin Signals

Pin	VGA Signal	Description
1	GND	Ground
2	Tx A+	Transmit Signal A-Positive
3	Tx A–	Transmit Signal A-Negative
4	GND	Ground
5	Rx A+	Receive Signal A-Positive
6	Rx A–	Receive Signal A-Negative
7	GND	Ground

A.6.2 I/O Board Paddle Card

A.6.2.1 VGA Monitor Port

- *Connector Type:* 15-pin, D-Subminiature (Female) SVGA Connector
- *Manufacturer; Part:* AMP; 2-1734344-3

A Super-VGA connector is installed on the XV2 I/O Board P2 Paddle Card on its front edge. A pinout for this connector is given in *Figure A-17*, and connector-pin signals are described in *Table A-24*.

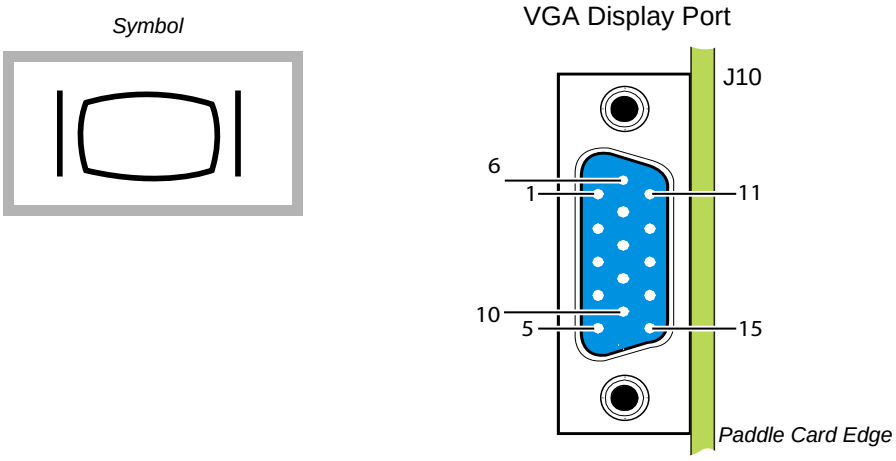


Figure A-17. I/O Board P2 Paddle Card VGA Connector Pinout

Table A-24. I/O Board P2 Paddle Card VGA Connector-Pin Signals

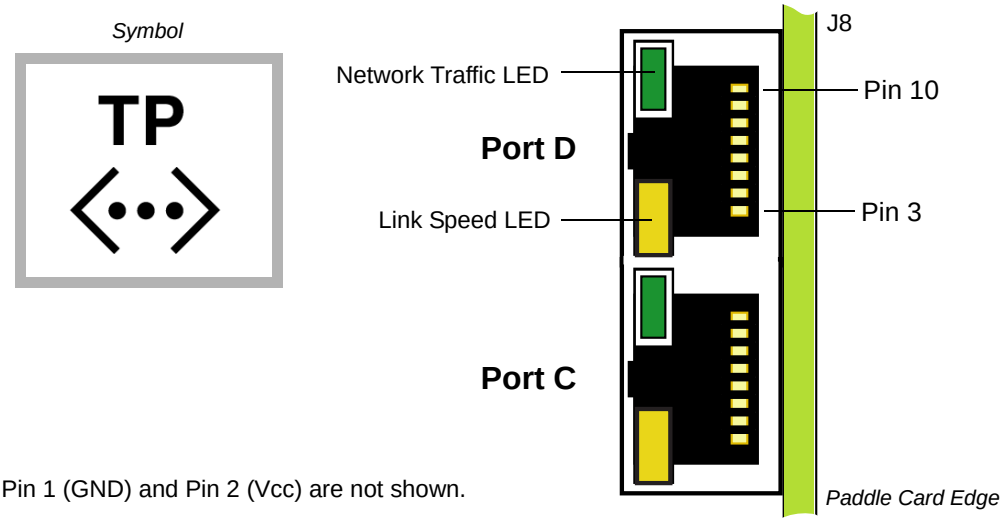
Pin	VGA Signal	Description
1	RED OUT	Red signal output
2	GREEN OUT	Green signal output
3	BLUE OUT	Blue signal output
4	*NC*	No connection
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground

Pin	VGA Signal	Description
9	VCC	Filtered Vcc voltage source
10	GND	Ground
11	*NC*	No connection
12	SDA	Display Data Channel—Data
13	HSYNC	Horizontal synchronization
14	VSYNC	Vertical synchronization
15	SCL	Display Data Channel—Clock

A.6.2.2 Gigabit Ethernet (GbE) Ports C and D

- *Connector Type:* Dual RJ45 GbE Connector, 16 Pins, 4 LEDs, 2 transformers
- *Manufacturer; Part Number:* Pulse; J0G-0009NL

The XV2 I/O Board P2 Paddle Card provides dual Gigabit Ethernet ports (C and D) on its front edge. Each RJ45 (8-pin) GbE connector contains two embedded LEDs, supports 10/100/1000Base-T transmission (see *Figure A-18* and *Table A-25* below), and has an embedded transformer for signal conversion.



Note: Pin 1 (GND) and Pin 2 (Vcc) are not shown.

Figure A-18. Gigabit Ethernet RJ45 Pinout—Port C (Bottom) and Port D (Top)

Table A-25. Gigabit Ethernet Connector-Pin Signals and LED Interpretation

Pin	Port C Signal	Description (MDI = Medium-Dependent Interface)	Port D Signal	Description
10	MDI_0–	Bi-directional pair A–	MDI_0–	Bi-directional pair A–
9	MDI_0+	Bi-directional pair A+	MDI_0+	Bi-directional pair A+
8	MDI_1–	Bi-directional pair B–	MDI_1–	Bi-directional pair B–
7	MDI_1+	Bi-directional pair B+	MDI_1+	Bi-directional pair B+
6	MDI_2–	Bi-directional pair C–	MDI_2–	Bi-directional pair C–
5	MDI_2+	Bi-directional pair C+	MDI_2+	Bi-directional pair C+
4	MDI_3–	Bi-directional pair D–	MDI_3–	Bi-directional pair D–
3	MDI_3+	Bi-directional pair D+	MDI_3+	Bi-directional pair D+

LED	LED Color	Interpretation
Green/Amber (*Bottom*) = Link Speed	OFF	10 Mb/s
	Green	100 Mb/s
	Amber	1000 Mb/s
Green (*Top*) = Network Traffic	Flashing rate is 300 ms for transmit/receive activity.	

A.6.2.3 SAS/SATA Port

- *Connector Type:* SAS/SATA Connector, 7 Pins
- *Manufacturer; Part Number:* Circuit Assembly; CA-D14SAHPR-X-0-5T

A connector pinout for the I/O Card SAS/SATA port is shown in *Figure A-19*.

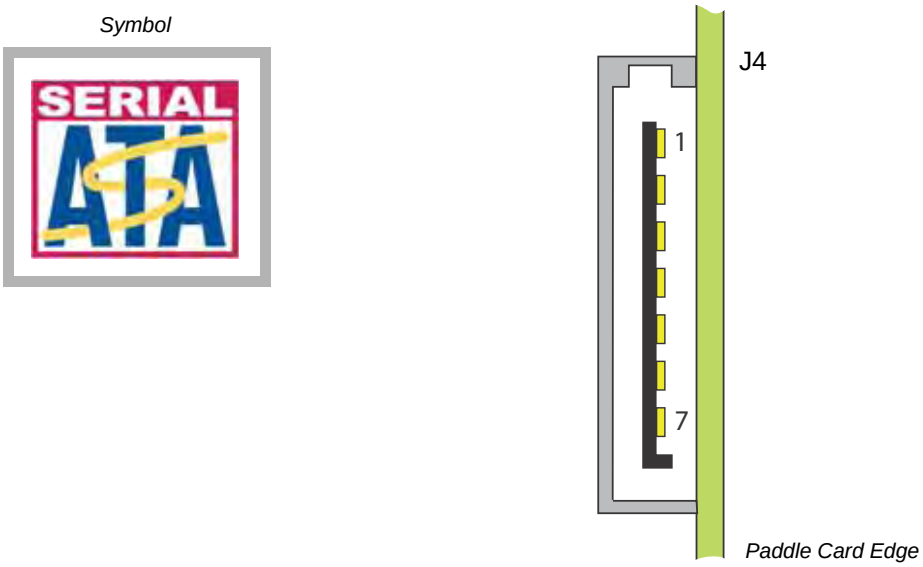


Figure A-19. I/O Board SATA Connector Pinout

Connector-pin signals for the SAS/SATA connector are described in *Table A-26*.

Table A-26. I/O Board SAS/SATA Connector-Pin Signals

Pin	Signal
1	GND
2	SATA1_TX_BUF_P
3	SATA1_TX_BUF_N
4	GND
5	SATA1_RX_BUF_N
6	SATA1_RX_BUF_P
7	GND

A.6.2.4 Auxiliary +12-Volt/+5-Volt Power Connectors

- *Connector Type:* 6-pin In-line Connector (Female), 2 required
- *Manufacturer; Part:* Molex; 43650-0600
- *Themis Cable P/N:* 111230-001

Auxiliary power can be both +12V and +5V. The I/O Board Paddle Card can provide auxiliary power +12V or +5V for demanding XMC modules via the 6-pin Molex connector J1 (see *Figure A-20*).

Auxiliary +12-Volt Power Connector

The I/O Board Paddle Card provides +12-volt power to the XV2 from the 12-volt rail through multiple P2 pins in row A (see *Table A-2* on page A-4) of the VME P2 backplane. The system power supply also provides +12 volts to the Paddle Card through the 6-pin Molex connector J1 or J15—only one +12-volt connection is required (see *Figure A-20*; the mating plug is an ITT Cannon connector, P/N 192990-0980). Use power cable P/N 111230-001.

Warning: The Themis cable connected to this power connector should receive +12V directly from the +12V lug on the chassis power supply, not from +12V pins on the backplane or from the +12V cable supplying the backplane.

Power connector pinout signals are defined in *Table A-27*.

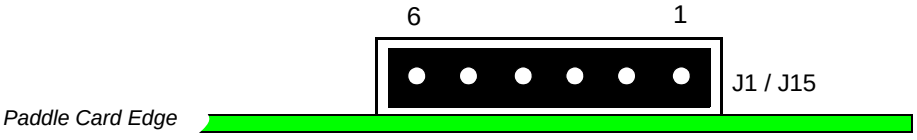


Figure A-20. P2 Paddle Card Power Connector Pinouts

Table A-27. +12V/+5V Power Connector-Pin Signals

Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6
+12V / +5V	+12V / +5V	+12V / +5V	Ground	Ground	Ground

Auxiliary +5-Volt Power Connectors

The system power supply can also provide +5 volts to the Paddle Card through connectors J1 and J15—both +5-volt connections are required. Use two power cables (P/N 111230-001).

Appendix B

Jumper Pins and Solder Beads

This appendix provides jumper-pin and solder-bead locations and configurations for the XV2. **Solder beads** are considered "factory-configurable" and *must not be altered* by the user. If a solder bead requires reconfiguration, contact Themis Customer Service.

Warning: Solder beads are set by Themis at the factory. Attempting to alter a solder-bead configuration could seriously damage the XV2. If you encounter a problem, contact Themis Customer Support.

DO NOT ATTEMPT TO ALTER SOLDER-BEAD CONFIGURATIONS.

B.1 Field-Configurable Jumper Pins

B.1.1 XV2 CPU Board Jumper Pins

There are no jumper pins the XV2 I/O Board.

B.1.2 XV2 I/O Board Jumper Pins

There are no jumper pins the XV2 I/O Board.

B.1.3 Memory Module Jumper Pins

There are no jumper pins on the XV2 Memory Modules.

B.2 Factory-Configurable Solder Beads

B.2.1 XV2 CPU Board Solder Beads

On the CPU Board, solder beads are found only on the bottom side and are described in *Table B-1*. In *Table B-1*, **Short** means a solder bead is installed, creating an electrical path between two contacts. **Open** means no solder bead is installed, hence the path between the contacts is open.

Figure B-1 on page B-4 shows the location of all CPU Board solder beads (bottom side only). Remember that **pin 1** is indicated on the board by a **thick bar line.**

Caution: When dealing with a **3-pin** solder-bead switch, a solder bead will short only one set of pins, either 1–2 or 2–3.
If a solder bead shorts more than 2 pins, call Themis Customer Support.

Table B-1. XV2 CPU Board Solder-Bead Settings (Bottom Side Only)

Solder Bead	Setting[a]	Description
SB6	Short	Disable FPGA
	Open	Enable FPGA
SB7	Short	Enable FPGA debug
	Open	Disable FPGA debug
SB13	Short	Enable VME to local reset
	Open	Disable VME to local reset
SB14	Short	Enable reset to VME
	Open	Disable reset to VME
SB15	Short	Reset TPM
	Open	*Normal operation*
SB16	Short	Reset TS1384
	Open	*Normal operation*

Table B-1. XV2 CPU Board Solder-Bead Settings (Bottom Side Only) (Continued)

Solder Bead	Setting[a]	Description
SB17	Short	Reset 82571
	Open	*Normal operation*
SB18	Short	Reset BMC
	Open	*Normal operation*
SB19[b]	Short 1–2	Route KB/Mouse to Front Panel
	Short 2–3	Route KB/Mouse to Rear Panel (P2)
SB20[b]	Short 1–2	Route KB/Mouse to Front Panel
	Short 2–3	Route KB/Mouse to Rear Panel (P2)
SB21[b]	Short 1–2	Route KB/Mouse to Front Panel
	Short 2–3	Route KB/Mouse to Rear Panel (P2)
SB22[b]	Short 1–2	Route KB/Mouse to Front Panel
	Short 2–3	Route KB/Mouse to Rear Panel (P2)
SB23[b]	Short 1–2	Route KB/Mouse to Front Panel
	Short 2–3	Route KB/Mouse to Rear Panel (P2)
SB24	**Short 1–2**	Route fixed VREF A circuit to Channel A VREFDQ
	Short 2–3	Route margining REF circuit to Channel A VREFDQ
SB25	**Short 1–2**	Route fixed VREF A circuit to Channel A VREFCA
	Short 2–3	Route margining REF circuit to Channel A VREFCA
SB26	**Short 1–2**	Route fixed VREF A circuit to Channel B VREFDQ
	Short 2–3	Route margining REF circuit to Channel B VREFDQ
SB27	**Short 1–2**	Route fixed VREF A circuit to Channel B VREFCA
	Short 2–3	Route margining REF circuit to Channel B VREFCA
SB28	**Short 1–2**	Route fixed VREF A circuit to Channel C VREFDQ
	Short 2–3	Route margining REF circuit to Channel C VREFDQ
SB29	**Short 1–2**	Route fixed VREF A circuit to Channel C VREFCA
	Short 2–3	Route margining REF circuit to Channel C VREFCA
SB30	Short	Route flash cycles to LPC bus
	Open	*Normal operation*

a—Boldface = the default solder-bead setting. Absence of a default setting indicates a manufacturing or user decision.

b—Solder beads SB19 through SB23 must be set to the same value at the same time.

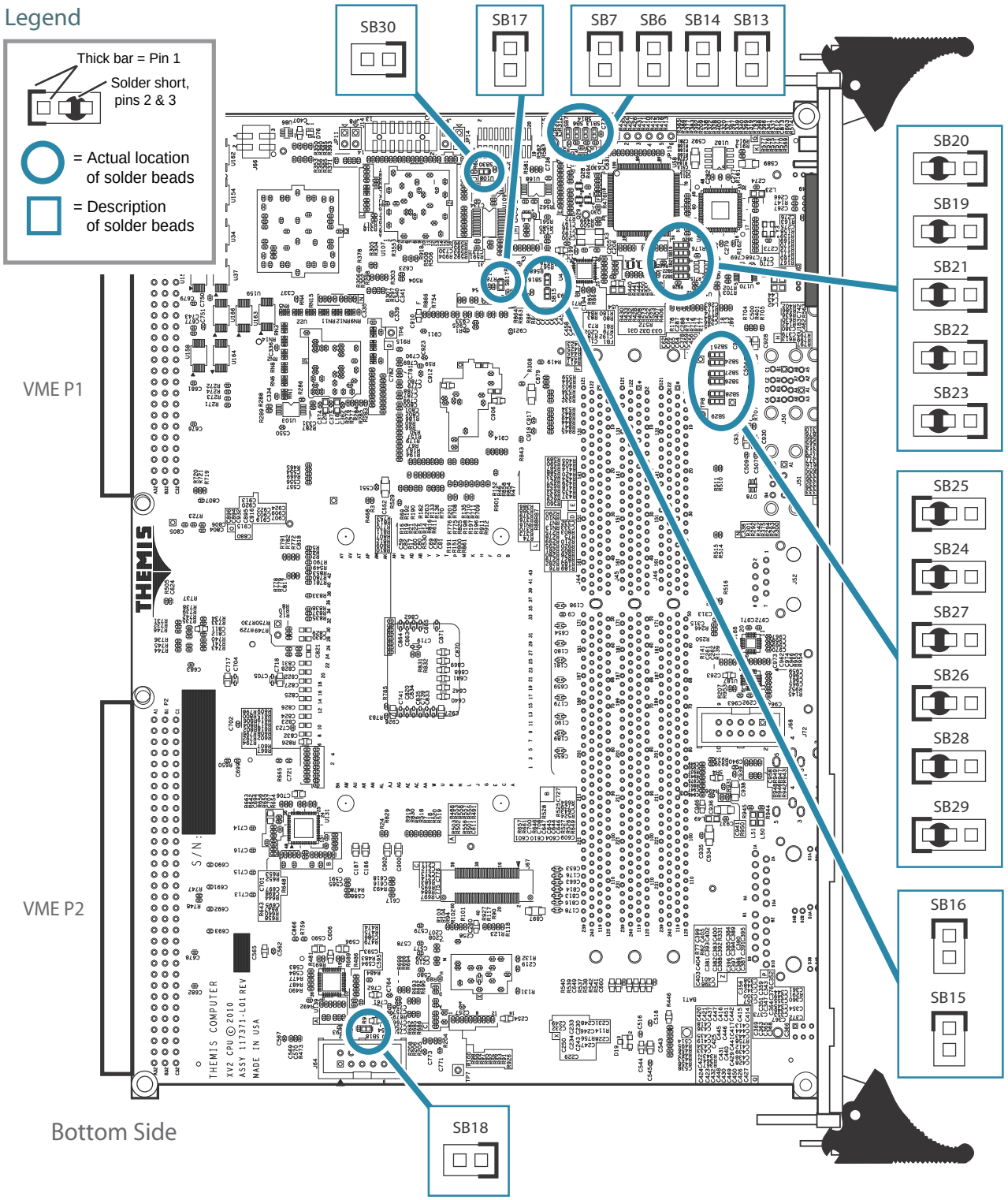


Figure B-1. XV2 CPU Board Solder-Bead Locations (Bottom Side Only)

B.2.2 XV2 I/O Board Solder Beads

On the XV2 I/O Board solder beads are found only on the top side and are described in *Table B-2*. In *Table B-2*, **Short** means a solder bead is installed, creating an electrical path between two contacts. **Open** means no solder bead is installed, hence the path between the contacts is open.

Table B-2. XV2 I/O Board Solder-Bead Settings (Top Side Only)

Solder Bead	Setting[a]	Description
SB1	Short	Disable the ES1000 VGA controller
	Open	*Normal operation*
SB2	Short	Disable the PCI-express switch PEX8632
	Open	*Normal operation*
SB3	Short	Disable the SAS controller 1068e
	Open	*Normal operation*
SB4	Short	Disable the Network controller 82571
	Open	*Normal operation*
SB5	Short	Disable the PCI-Express to PCI-X bridge Tsi384
	Open	*Normal operation*
SB6	Short	Disable XMC slot-1
	Open	*Normal operation*
SB7	Short	Disable XMC slot-2
	Open	*Normal operation*

a—Boldface = the default solder-bead setting. Absence of a default setting indicates a manufacturing or user decision.

Figure B-2 on page B-6 shows the location of all I/O Board solder beads (top side only). Remember that **pin 1** is indicated on the board by a **thick bar line.**

Caution: When dealing with a **3-pin** solder-bead switch, a solder bead will short only one set of pins, either 1–2 or 2–3.
If a solder bead shorts more than 2 pins, call Themis Customer Support.

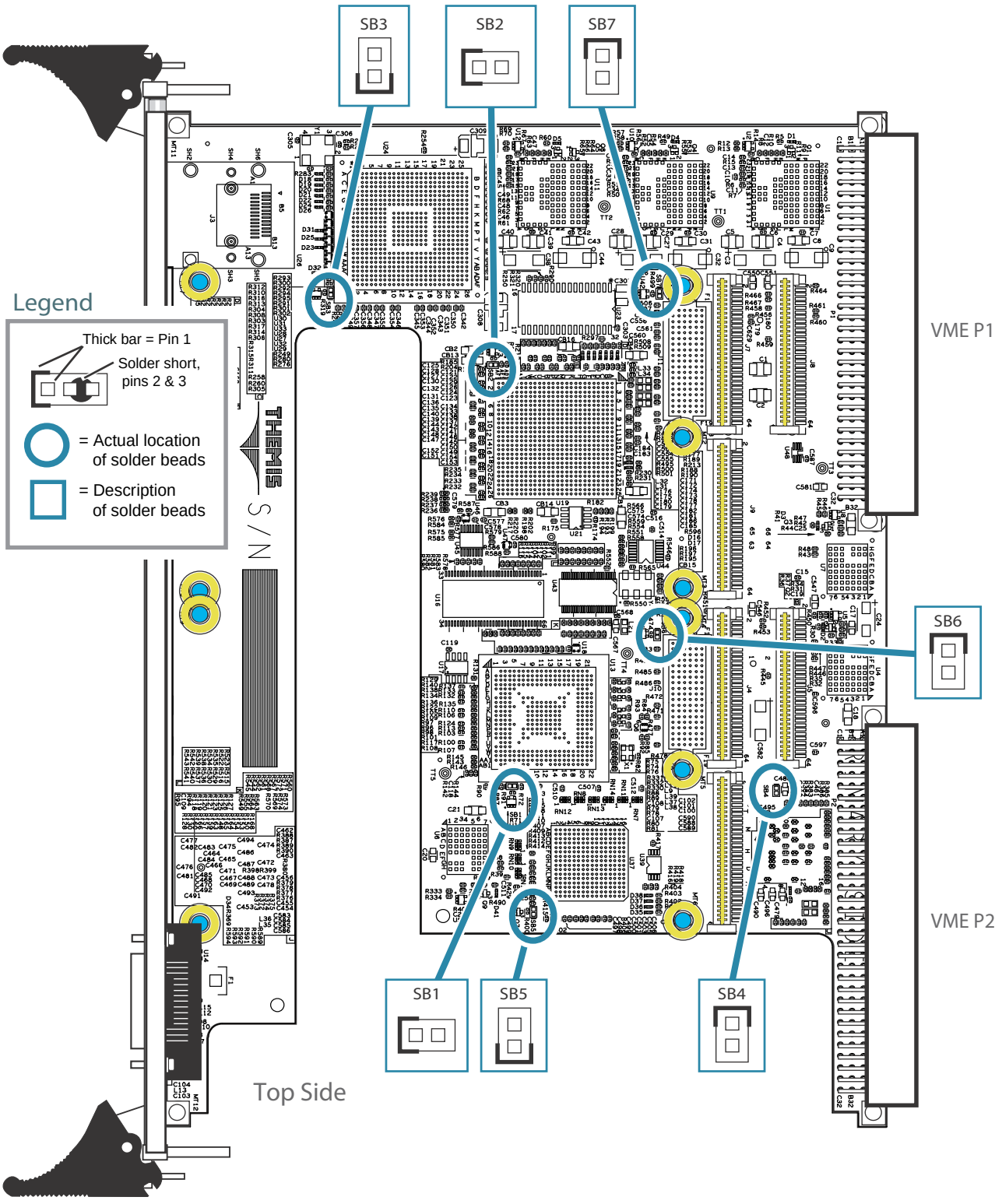


Figure B-2. XV2 I/O Board Solder-Bead Locations (Top Side Only)

B.2.3 Memory Module Solder Beads

There are no solder beads on the XV2 Memory Module

Appendix C

Front-Panel I/O Connections and LEDs

C.1 Introduction

This appendix contains diagrams of all front panels (faceplates) for each possible model configuration of the XV2. It is intended as a reference to I/O and monitoring functions. See *Table C-1* for a list of XV2 models (only one model at the present).

Caution: The PCI address of a PMC Module is not necessarily the same as the PMC Module slot number.

Table C-1. XV2 Model Configurations

Model	Baseboard
	XMC/PMC Modules
XV2 / 1	2 Modules (2 VME Slots)

C.1.1 Front-Panel Dimensions

A dual-slot XV2 front panel measures 235-mm (9.25”) high by 40-mm (1.576”) wide.

C.1.2 Injector/Ejector Handles

The XV2 is equipped with two types of injector/ejector handles (see *Figure C-1* on page C-3):

- VME64-type handles (Elma, for example), which aid in both the insertion and the extraction of the PC board into and out of the VME backplane connectors
- Legacy-VME handles, which aid only in the extraction of the PC board from the VME backplane connectors

When a PCB board product such as the XV2 is shipped from Themis, VME64-type handles will be installed unless the customer specifies a different handle such as the Legacy-VME.

C.1.2.1 VME64-type Handles

When ordered, all Themis board products are shipped with VME64-type handles unless otherwise specified. A multiple-slot system will be shipped with all handles secured together by mating pins. One pin is inserted through two adjacent handles. This assures that all boards will lock onto and release from the VME rack frame at the same time.

On those occasions when the customer is upgrading and must add or replace a board in the system, it is important to make sure that a mating pin is used to secure two adjacent handles.

C.1.2.2 Legacy-VME Handles

When extracting a multiple-board system from the VME rack frame, it is important to remember that—since there is no mating pin to hold handles together—each handle works independently from all other handles, hence the operator must extract the system from the rack frame by carefully manipulating each handle in the same direction until the system is totally removed from the rack.

Caution: Removal of the EMI shield and insertion of a spine between mating front panels is a factory procedure and not recommended in the field.

A VME64 Injector/Ejector Handle

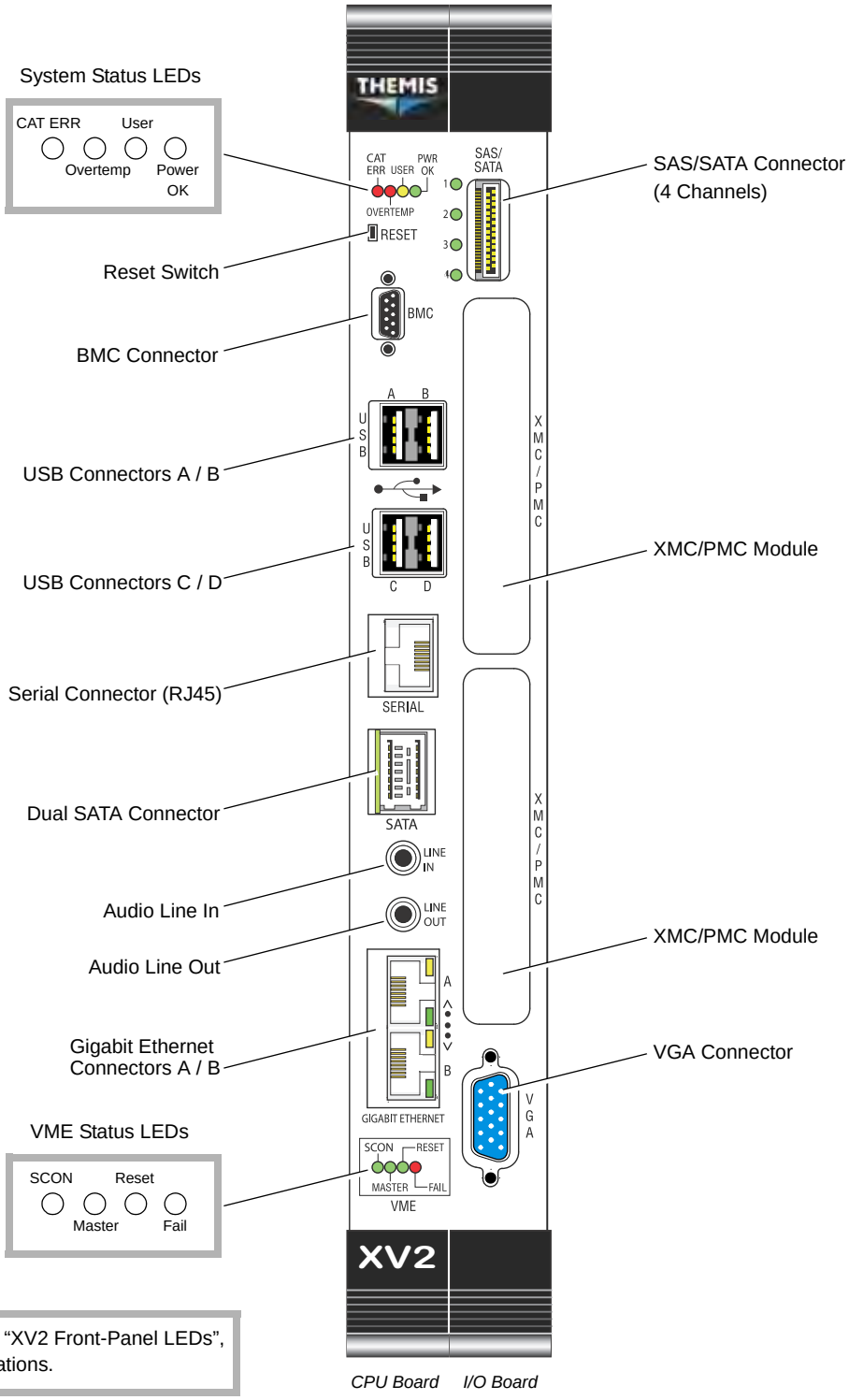
B Legacy-VME Ejector Handle

Figure C-1. XMC/PMC Injector/Ejector Handles

C.2 XV2 Front Panels

This section contains descriptive graphics of the front-panel I/O connections and LEDs for each XV2 model configuration listed in *Table C-1* on page C-1 (see *Figure C-2*, page C-4).

C.2.1 XV2/1 Front Panel



Note:

See Section C.3, “XV2 Front-Panel LEDs”, for LED interpretations.

Figure C-2. XV2/1 Front Panel

C.3 XV2 Front-Panel LEDs

Callouts indicating front-panel LEDs are shown in *Figure C-3*. Description and interpretation of front-panel LEDs are given in *Table C-2* on page C-6.

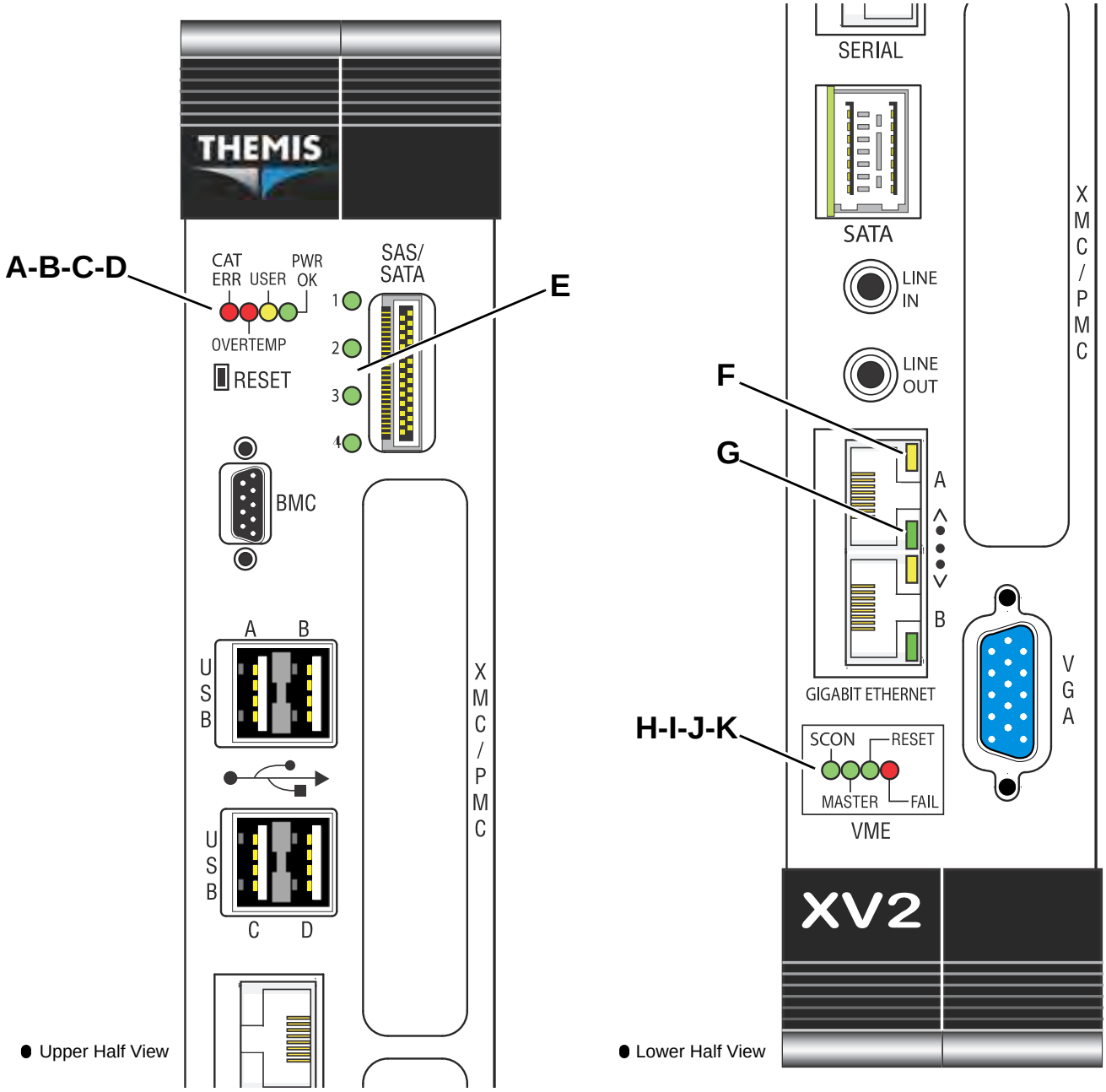


Figure C-3. XV2 Front-Panel LEDs

Table C-2. Front-Panel LED Interpretation

Item	Callout	Function	Color	Interpretation
System Status	**A**	Catastrophic Error (CAT ERR)	Red	A CPU catastrophic error has been detected
	B	Overtemp Shutdown	Red	XV2 is in shutdown mode caused by a CPU overtemperature condition
	C	User	Yellow	User-defined LED (SIO GPIO15)
	D	Power OK (PWR OK)	Green	All power on XV2 Boards is OK
SAS/ SATA	**E**	LED 1	Blue	LED 1, LED 2, LED 3, and LED 4 indicate a link between a SAS/SATA device and the device controller
		LED 2	Blue	
		LED 3	Blue	
		LED 4	Blue	
Ethernet Port A and Port B	**F**	Link Speed	OFF	10 Mbit/s
			Green	100 Mbit/s
			Amber	1000 Mbit/s
	G	Network Activity	Green	Lights when traffic is detected on the network
VME Status	**H**	SCON	Green	XV2 is the VME system controller
	I	Master	Green	XV2 is the VME master
	J	Reset	Green	VME reset
	K	Fail	Red	VME bus failure

Appendix D

Board Component and Connector Diagrams

The following sections of this appendix contain diagrams of the various boards of the XV2. It is intended as a quick reference to component and connector identification. XV2 boards included are:

- CPU Board
- I/O Board

D.1 XV2 CPU Board

Figure D-1 on page D-2 identifies the front-panel, major board-surface components and connectors as seen from the top side of the XV2 CPU Board.

D.2 XV2 I/O Board

Figure D-2 on page D-3 identifies the front-panel, major board-surface components and connectors as viewed from the top side of the XV2 I/O Board.

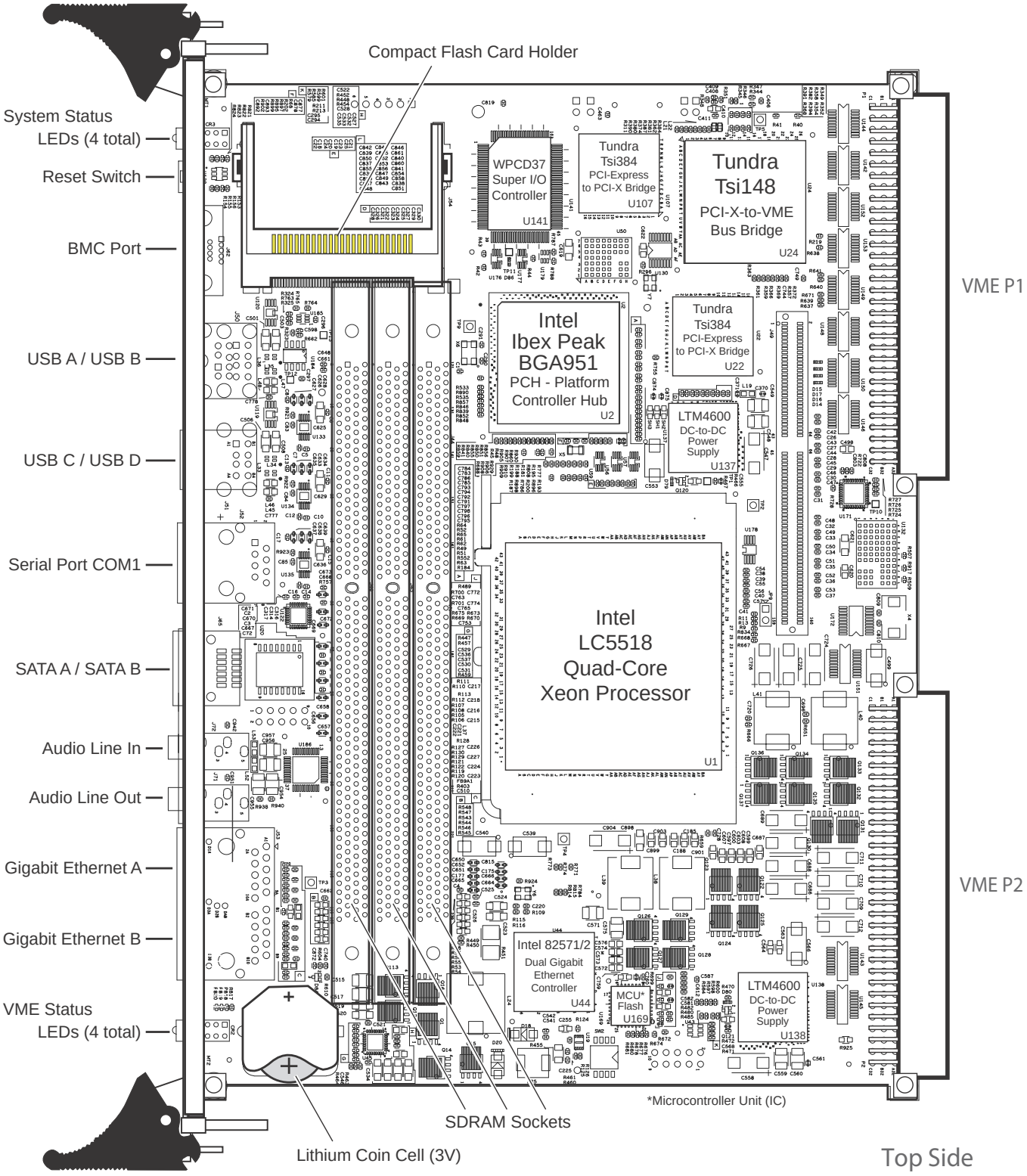


Figure D-1. XV2 CPU Board Component and Connector Diagram (Top Side)

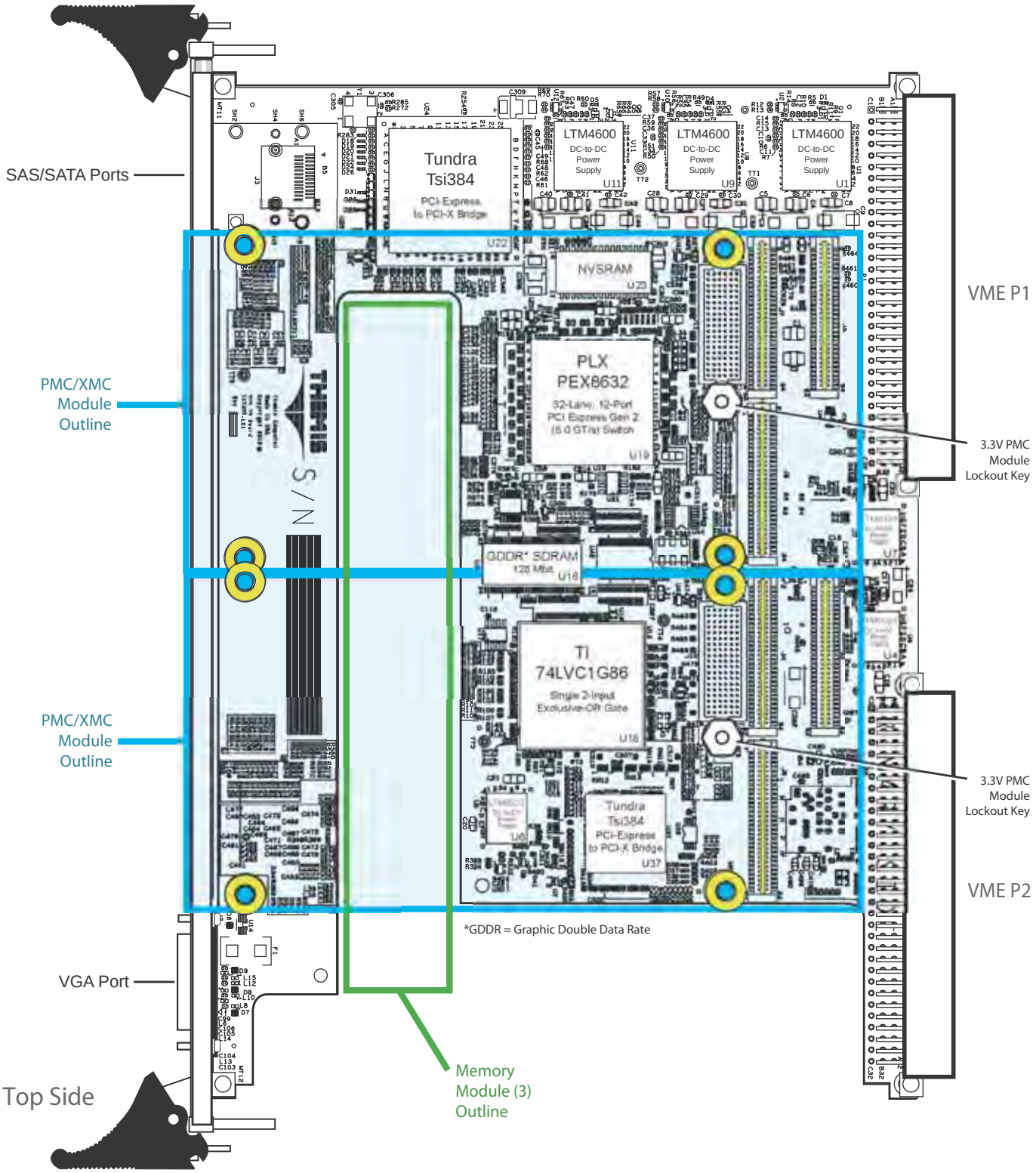
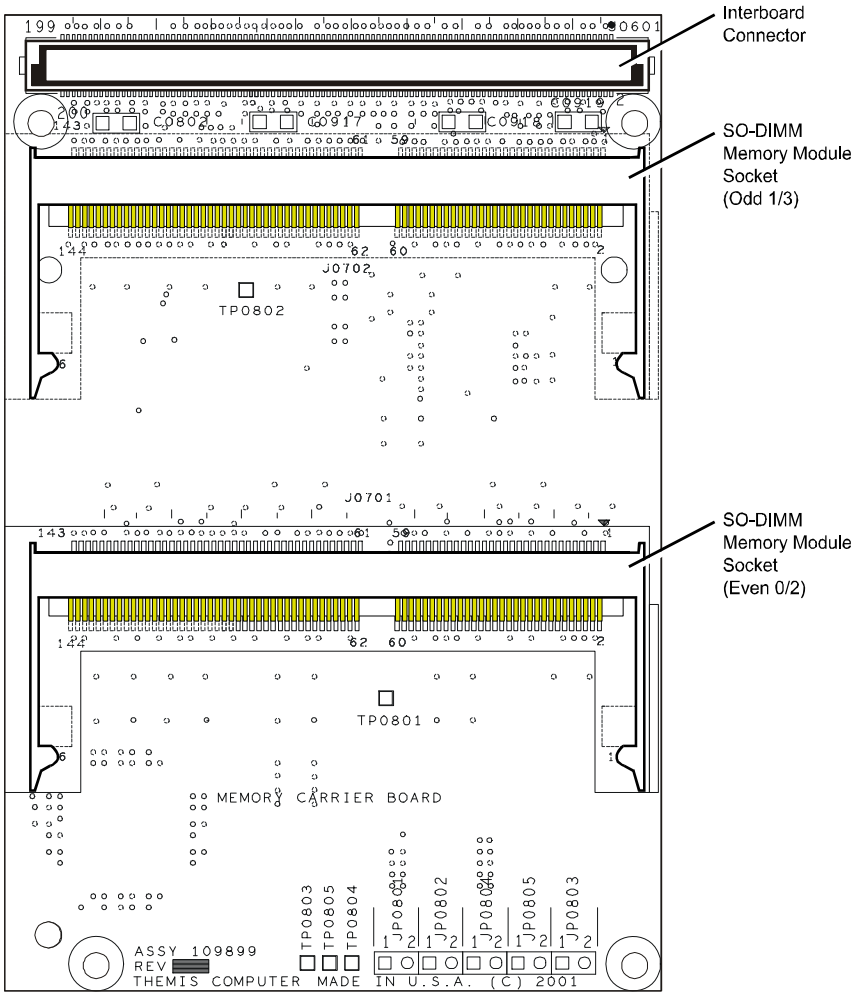


Figure D-2. XV2 I/O Board Component and Connector Diagram (Top Side)

D.3 Memory Module

Figure identifies the major components on the Memory Module as seen from the component side.



Memory Module (Component Side)

Appendix E

VME Slot Configurations

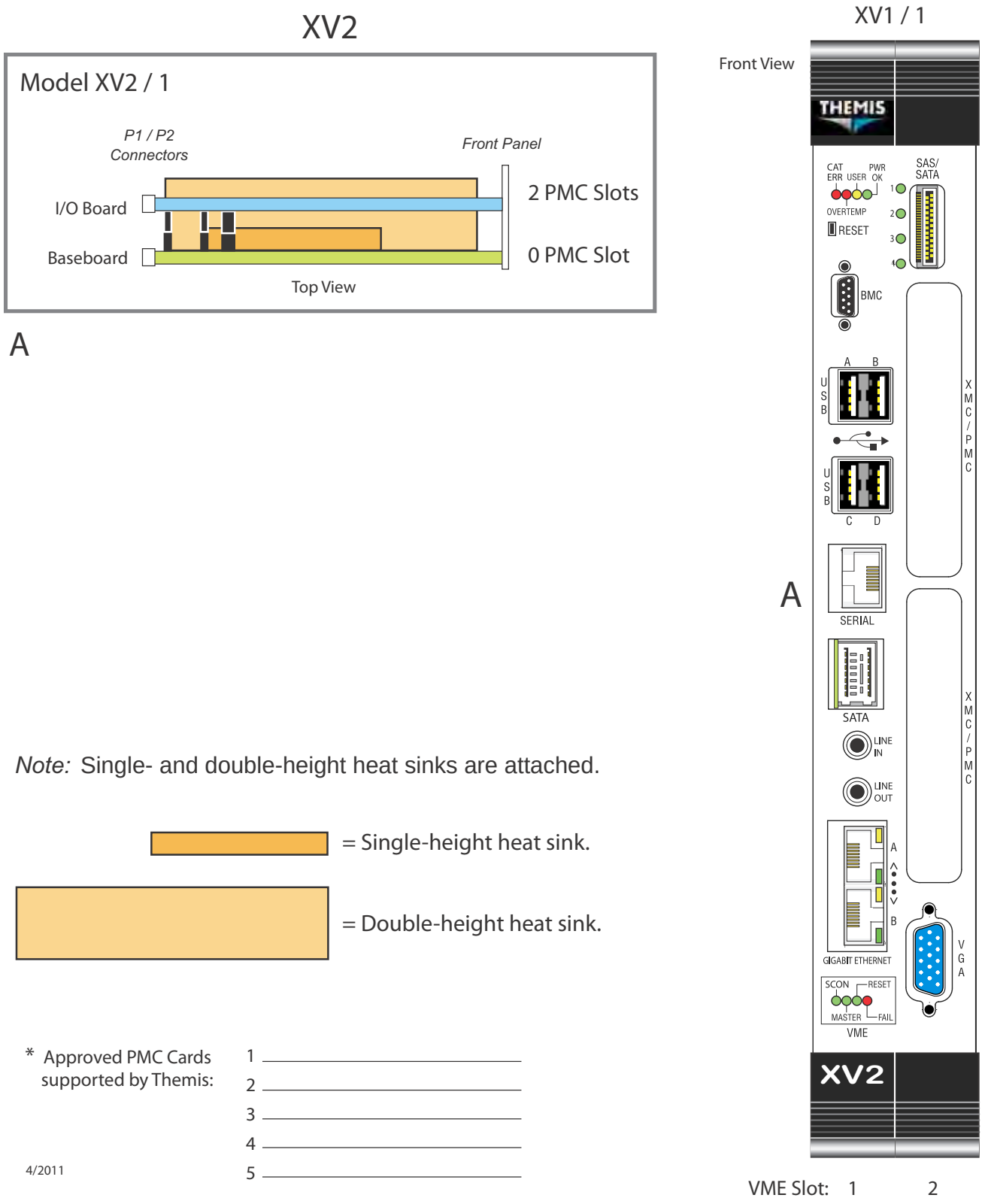
Figure E-1 on page E-2 illustrates the slot configurations of all XV2 models (only one at the present). Users may supplement the onboard XV2 graphics capability by installing a TGA-7000 PMC graphics accelerator card in an available PMC Module slot.

Table E-1 summarizes the model configurations (only one model exists at the present).

Table E-1. XV2 Model Configurations

Model	Baseboard
	XMC/PMC Modules
XV2 / 1	2 Modules (2 VME Slots)

Caution: The original Themis 2P2 XMC/PMC Carrier Board or 2P2/2P3 PMC Carrier Boards physically cannot be installed onto the XV2.



Note: Single- and double-height heat sinks are attached.

= Single-height heat sink.

= Double-height heat sink.

* Approved PMC Cards supported by Themis:

1 _____
2 _____
3 _____
4 _____
5 _____

4/2011

Figure E-1. XV2 VME Slot Configurations

Appendix F

Re-Packing Instructions

F.1 Re-Packaging for Shipment

If it becomes necessary for any reason to return your XV2 unit back to Themis, it is very important that the original packaging materials be used according to the repackaging instructions found in this appendix. Themis has qualified all of its shipping materials to meet the highest of standards and the rigors of today's shipping methods, thus insuring total protection of the product during delivery. Failure to use original packaging materials, exactly as described in this appendix **may invalidate the warranty**. If the original packaging is no longer serviceable, or no longer available, please contact Themis Customer Support for a new shipping box to send back your XV2. When using the original packaging, please remember to place your XV2 back into the static protection bag.

Caution: Failure to use the original Themis packaging materials, and failure to follow the instructions of this Appendix, **may invalidate the warranty**.

The following instructions assume the original packaging components are still available, and in serviceable condition. If not, please contact Themis for a new shipping box and packaging components for your XV2.

F.2 Packing Components

The original packing components are shown in *Figure F-1*. They comprise a packaging box, perimeter crush resistant foam, and upper (perimeter) crush-resistant removable foam pieces to accommodate all XV2 variations. The top and bottom crush-resistant foam layers are identical components, placed so that the flat side is always facing up (toward the opening of the box).

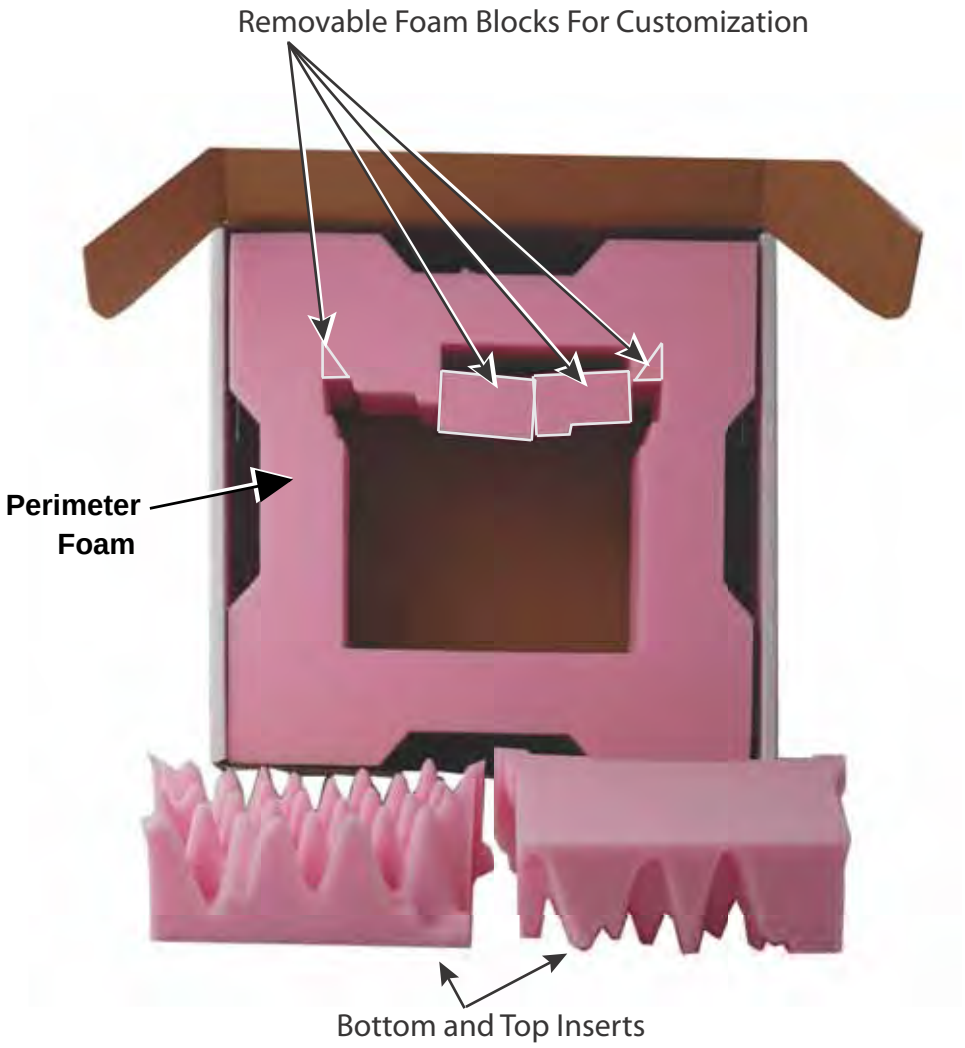


Figure F-1. Packaging Components

F.3 Instructions for Re-Packing

Re-assemble the packaging material about the equipment in accordance with the following instructions (see *Figure F-2* on page F-4):

1. Inspect the original packaging materials for serviceability.
2. Place perimeter crush-resistant layer into the shipping box, making sure the corners of the foam fit snugly into the corners of the box.
3. Place the first top/bottom layer into the box, centered into the perimeter foam cutout. Make sure the flat side of the foam is facing up (opening of box).
4. Place the wrapped (static protection bag) XV2 on top of the layer (top/bottom layer) that was just inserted into the middle of the shipping box.
5. Place the remaining top/bottom layer directly on top of the wrapped XV2 unit. Make sure the flat side of the foam is facing up (opening of box).
6. Make sure all components of the box are firmly in place, pressing down on the surface area of the foam to insure proper seating of the material.
7. Seal the top of the box with strong packaging tape, wrapping the tape completely around the box, both lengthwise, and crosswise.
8. Prepare for shipment in accordance with the instructions received from Themis Computer.

Note: Please contact Themis if new packaging material, or shipping instructions are required. You can reach Themis at 1 (510) 252-0870 Mon–Fri, 8am–5pm PST, or by Email to support@themis.com.

The order of assembly when repackaging the XV2 for shipment is shown in *Figure F-2*.

Figure F-2. Order of Assembly

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